EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate B – Carbon Markets & Clean Mobility
Unit B.4 – Mobility (II): Air, Rail, Water and Intermodal Policy

Guidance Document

The EU ETS and MRV Maritime
Guidance for Accreditation and Verification

Guidance document No. 3,
Final version, 11 February 2025

Disclaimer

This document is part of a series of documents provided by the Commission services for supporting the implementation of the EU ETS (the European Union Emission Trading System).

The guidance represents the views of the Commission services at the time of publication. It is not legally binding.

Version History

Date	Version status	Remarks
11 February 2025	Published	This document covering the verifiers' tasks for MRV Maritime and EU ETS for shipping companies takes into account comments received from the CCEG Maritime and ESSF

TABLE OF CONTENTS

1 INTRODUCTION 6

1.1 Legal context 6

1.2 How to read this Guidance Document? 7

1.3 Where to find further information 7

2 OVERVIEW OF M-AVR CONCEPTS 9

2.1 Roles and responsibilities in EU ETS and Maritime MRV 9

2.2 Relation between legislation, harmonised standards and guidance 11

3 VERIFICATION PRINCIPLES 14

3.1 Reliability of verification 14

3.2 Independence of the verifier 15

3.3 Professional scepticism 15

3.4 Reasonable level of assurance 15

3.5 Materiality 16

3.6 Scope of verification 17

4 VERIFIER'S ACTIVITIES UNDER THE MRV MARITIME REGULATION 18

4.1 Assessment of Monitoring Plans 18

4.1.1 Information to be provided by the shipping company 19

4.1.2 Assessment of the monitoring plan 19

4.1.3 Site visit for MP assessment 20

4.1.4 Addressing non-conformities 22

4.1.5 Independent review 22

4.1.6 Verifier's conclusions 22

4.1.7 Assessment of MP changes 22

4.1.8 Retroactive assessment 23

4.2 Verification of emissions and partial emission reports 24

4.2.1 Pre-contract stage 25

4.2.2 Information to be provided by the shipping company 26

4.2.3 Strategic analysis 27

4.2.4 Risk analysis 28

4.2.5 Verification plan 30

4.2.6 Process analysis 30

4.2.7 Verification of reported data 31

4.2.8 Treatment of data gaps 33

4.2.9 Site visits 34

4.2.10 Addressing misstatements, non-conformities and the materiality level during verification 36

4.2.11 Concluding on the findings of the verification of the emissions report and partial emissions report 36

4.2.12 Recommendations for improvement 37

4.2.13 Internal verification documentation 37

4.2.14 Independent review of the emissions report and partial emissions report 37
4.2.15 Verification report and Document of Compliance 39
4.2.16 Addressing outstanding issues in the verification report 40
4.3 Verification of reports at shipping company level 42
4.3.1 Information provided by the shipping company 42
4.3.2 Strategic analysis 43
4.3.3 Risk analysis 43
4.3.4 Data verification 44
4.3.5 Site visits 45
4.3.6 Concluding on the verification of the CER 46
4.4 Addressing misstatements, non-conformities and their materiality 46
4.4.1 Definitions 46
4.4.2 Materiality levels 48
4.4.3 Relationship between materiality and uncertainty 48
4.4.4 Approach to assessing the materiality of misstatements and non-conformities 50
4.4.5 Examples of material misstatements 51
5 REQUIREMENTS FOR VERIFIERS 53
5.1 Continued competence process 53
5.1.1 Setting the framework 54
5.1.2 Evaluating and monitoring the competence and performance 54
5.1.3 Assessment of competence for a specific verification engagement 54
5.2 Impartiality and independence 55
5.3 Rotation of lead auditors 57
5.4 Outsourcing 58
5.5 Other issues 59
6 ACCREDITATION AND ACCREDITATION BODIES 60
6.1 Objectives of accreditation 60
6.2 Accreditation process 60
6.3 Monitoring of the verifier after accreditation 62
6.3.1 Surveillance 62
6.3.2 Reassessment 63
6.3.3 Extraordinary assessment 63
6.4 Administrative measures 64
7 INFORMATION EXCHANGE 65
7.1 Cooperation and information exchange 65
7.2 Information exchange across borders 67
7.3 Information exchange on surveillance 68
7.4 Database 68
8 ANNEXES 69
8.1 Annex I - Timeline for Verification 69

8.2 Annex II - Internal verification documentation 70
8.3 Annex III – Verification teams 72
8.4 Annex IV – Competence of different team members 75
8.5 Annex V – Procedures 80
8.6 Annex VI – Sampling 81
8.7 Annex VII – comparing ships' data to external sources 87
8.8 Annex VIII – Relevant Legislation 90
8.9 Annex IX – Acronyms 91

1 INTRODUCTION

1.1 Legal context

The MRV Maritime Regulation[1] establishes the overall legislative framework for the monitoring, reporting, and verification of greenhouse gas (GHG) emissions from maritime transport. Article 23 of the MRV Maritime Regulation confers on the European Commission the power to adopt delegated acts on the assessment of monitoring plans, the verification of partial emissions reports, emissions reports, emissions reports at shipping company level, on the accreditation of verifiers and on the supervision of the accreditation. On 20 October 2023, Commission Delegated Regulation (EU) 2023/2917 on the verification activities, accreditation of verifiers and approval of monitoring plans by administering authorities in the Context of the MRV Maritime Regulation was adopted. (This guidance refers to that act as the "**Maritime Accreditation and Verification Regulation (M-AVR)**[2]. The M-AVR replaced Commission Delegated Regulation (EU) 2016/2072. Together with the MRV Maritime Regulation, it currently provides the legislative framework for accreditation and verification as required for the inclusion of maritime transport activities in the EU Emissions Trading System established by the EU ETS Directive[3].

This guidance document is part of a suite of guidance documents developed by the Commission services to explain the requirements in the MRV Maritime Regulation and its implementing legislation. The suite of guidance documents supports a harmonised interpretation of the requirements by Member States and includes:

- A general guidance document for shipping companies on the EU ETS and MRV Maritime (GD 1);
- A guidance document (GD 2) on the approval of Monitoring Plans (MPs) by administering authorities.

Further guidance documents may be developed as required.

The current guidance document (GD 3) provides guidance to assist its users (verifiers, administering authorities, accreditation bodies, national authorities, shipping companies and other interested parties) in their understanding of the requirements of the M-AVR. This guidance document represents the views of the Commission services at the time of publication. It is not legally binding.

Where this supports the understanding and clarification of concepts and requirements, examples have been inserted in the text or attached as an annex.

[1] Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport, and amending Directive 2009/16/EC (Text with EEA relevance); Consolidated version: http://data.europa.eu/eli/reg/2015/757/2024-01-01

[2] Commission Delegated Regulation (EU) 2023/2917 of 20 October 2023 on the verification activities, accreditation of verifiers and approval of monitoring plans by administering authorities pursuant to Regulation (EU) 2015/757 of the European Parliament and of the Council on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport, and repealing Commission Delegated Regulation (EU) 2016/2072. Consolidated version: http://data.europa.eu/eli/reg_del/2023/2917/oj

[3] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC. Consolidated version: http://data.europa.eu/eli/dir/2003/87/2024-03-01

1.2 How to read this Guidance Document?

This guidance is structured as follows:

Chapter 2 explains the objectives and the main concepts of the M-AVR. It also outlines the roles and responsibilities of the different parties involved in applying the MRV Maritime Regulation and the EU ETS Directive (as far as maritime transport is concerned), and describes the interrelation between the M-AVR and other legislation, harmonised standards and the suite of guidance documents. It also provides an overview of other guidance documents developed to support a common interpretation.

Chapter 3 provides an introduction to verification and its main principles.

Chapter4 elaborates on the tasks to be carried out by verifiers under the MRV Maritime Regulation:

- Section 4.1 deals with the assessment of ships' monitoring plans by verifiers;
- Section 4.2 describes the verification process regarding ships' annual or partial Emission Reports (ERs);
- Section 4.3 gives guidance on the verification of Company-level Emission Reports (CERs) required for the purpose of the EU ETS.

This chapter explains the risks to be managed and the various steps to be followed in the assessment and verification process. Additionally, it outlines what activities must be carried out when issues are identified during the verification and cannot be resolved before the verification report is issued. Section 4.4 explains the important concept of materiality. It also describes the treatment of misstatements and non-conformities identified by the verifier.

Chapter 5 clarifies the requirements that verifiers have to meet in order to receive accreditation. It explains the main concepts of the competence process, the competence requirements, the impartiality and independence requirements, and the requirements on documentation and procedures to be established by verifiers.

Chapter 6 provides an explanation of the principles of accreditation and the steps that an accreditation body has to follow when accrediting and subsequently monitoring an accredited verifier. It also gives general information on the types of administrative measures an accreditation body can impose on a verifier in the case of violation of M-AVR requirements and procedures.

Chapter 7 clarifies the information exchange requirements laid down in Chapter VI of the M-AVR.

1.3 Where to find further information

This guidance document (GD 3) belongs to a series of guidance document provided by the Commission to harmonise the implementation of the EU ETS on maritime activities and the MRV Maritime Regulation across Member States. The starting point for learning about the MRV Maritime Regulation and the EU ETS is the Commission's Website:

https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector_en

It contains the following information:

- Relevant Maritime MRV legislation is found under "Documentation" Sub-section "Strategy and legislation on maritime transport emissions", as well as via the links given in the Annex of this document (section 8.8);
- Guidance documents are found under "Documentation" Sub-section "Guidance / best practice documents". The following documents are already available:

  - Maritime GD 1: General guidance for shipping companies: the EU ETS and MRV Maritime;
  - Maritime GD 2: General guidance on the process for approval of monitoring plans by administering authorities;
  - Maritime GD 3: (This document) Guidance for Accreditation and Verification.
- Answers to frequently asked questions are found in the section "FAQ". Please note that there are two set of FAQs: one focussed on maritime MRV-related obligations and one on maritime ETS-related requirements. Both are complementary.

Guidance on the use of the reporting tool THETIS-MRV is given in the form of videos on the THETIS-MRV website: **https://emsa.europa.eu/thetis-mrv/thetis-mrv-videos/**.

There is an extensive set of guidance documents on monitoring and reporting, and on verification and accreditation, in the EU ETS for stationary installations and aircraft operators. That guidance material is partly also interesting for shipping companies and maritime verifiers. The respective documents are indicated where relevant directly in this document. However, should those documents be updated, it may happen that the given links do not work anymore. In such case, please look up the respective document on the Commissions MRVA website:
https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification-eu-ets-emissions_en#documentation

The guidance documents developed for the verification in the EU ETS for installations and for aircraft operators are providing detailed insights which can also be useful for maritime verifiers. The general guidance for verifiers of installations is called "Explanatory guidance Document No. I (EGD I)" and gives a similar overview as the current document does for maritime verifiers. "AVR Guidance Document III (GD III)" is similar for verifiers of aircraft operators. More importantly, there are several "Key Guidance Notes (KGN)" which provide more in-depth guidance on specific topics that may also be of relevance for maritime verifiers. These are referenced in several parts of the current document. The following KGNs are available:

- KGN II.1 on the scope of verification;
- KGN II.2 on risk analysis;
- KGN II.3 on process analysis;
- KGN II.4 on sampling;
- KGN II.5 on site visits concerning installations;
- KGN II.6 on the verification report;
- KGN II.7 on competence of verifiers;
- KGN II.8 on the relation between EN ISO 14065 and AVR;
- KGN II.9 on the relation between EN ISO/IEC 17011 and AVR;
- KGN II.10 on information exchange;
- KGN II.11 on certification;
- KGN II.12 on time allocation in verification.

2 OVERVIEW OF M-AVR CONCEPTS

The MRV Maritime Regulation and the M-AVR have direct legal effect in the Member States. This means that the regulations do not require transposition and implementation in national legislation since their provisions apply directly to shipping companies, verifiers, administering authorities, accreditation bodies and other parties mentioned in the MRV Maritime Regulation and the M-AVR.

2.1 Roles and responsibilities in EU ETS and Maritime MRV

The compliance chain and the roles and responsibilities of each party involved in the EU ETS and in MRV Maritime is summarised by the following figure.

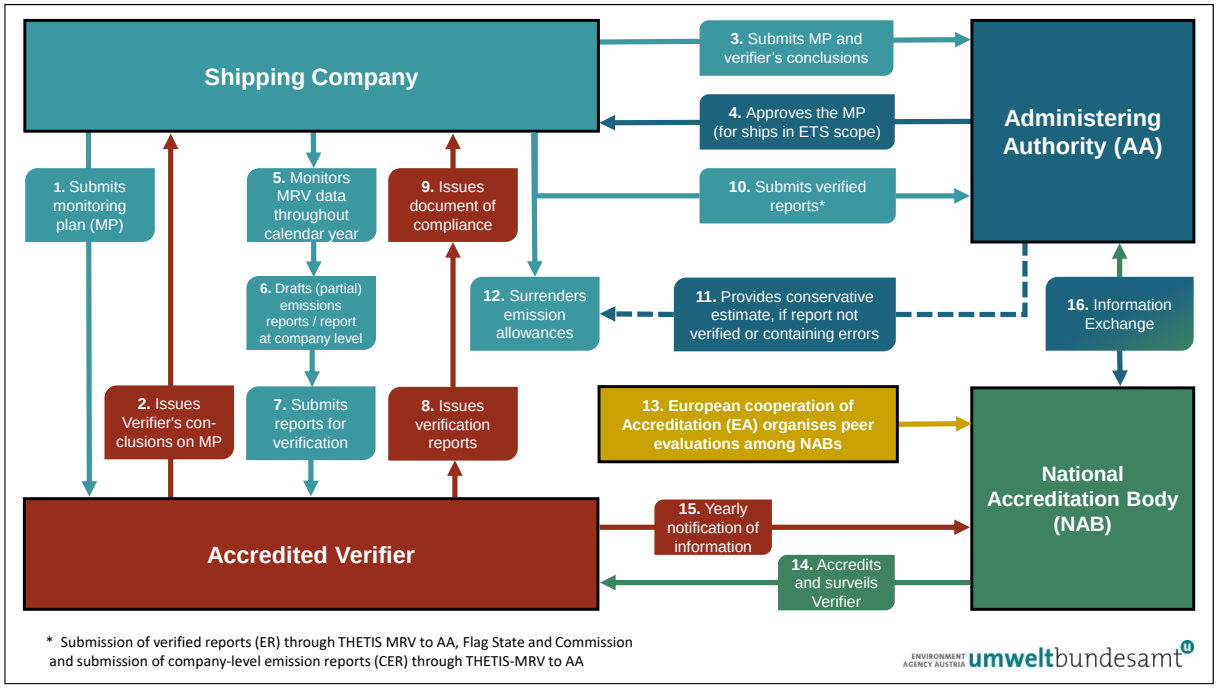

Figure 1: Roles and responsibilities of parties in the EU ETS and Maritime MRV. For details, please see explaining text below. The numbering does not imply necessarily a timely sequence, but purely serves the identification of steps described below.

The compliance chain (shown in Figure 1)[4] starts with the shipping company providing its draft monitoring plan (MP) as well as further relevant information to an accredited verifier for assessment **(Point 1)**. As required by the MRV Maritime Regulation, the verifier must assess the MP for its completeness, accuracy, relevance and conformity with the MRV Maritime Regulation **(Point 2)**. Upon positive assessment of the MP by the verifier, the shipping company submits the MP and the verifier's conclusions on the MP to the Administering Authority (AA) **(Point 3)**. For the ships carrying out activities within the scope of the EU ETS Directive, if the MP meets the requirements of the MRV Maritime Regulation, the

[4] Figure 1 focuses on the interactions between key actors under the scope of the present Guidance Document, namely shipping companies, verifiers, Administering Authorities, and National Accreditation Bodies (NABs). It is worth noting that the MRV Maritime Regulation requires shipping companies also to submit their Emissions Reports through THETIS-MRV to the European Commission.

AA approves the MP **(Point 4)**[5]. Throughout the whole calendar year, the shipping company must monitor its ships' MRV relevant data in accordance with the approved MP[6] and the MRV Maritime Regulation[7] **(Point 5)**. At the end of the calendar year the shipping company has to draft individual emissions reports for each of its ships, and – if falling within EU ETS scope – an emissions report at company level that meet the requirements of the MRV Maritime Regulation. In the case of a change of company during the reporting period, partial emissions reports have to be provided **(Point 6)**. All these reports must be verified **(Point 7)**.

The verifier's work involves an independent assessment of the MP, of the way it has been implemented and of the data sources that have been used to collect and collate the data in the shipping company's reports. Verification is an essential instrument in providing confidence to the AA and other relevant parties that the report submitted to the AA represents a faithful, true and fair account of the emissions data.

A verifier is a legal entity carrying out verification activities which is accredited by a national accreditation body pursuant to Regulation (EC) No 765/2008[8] and the MRV Maritime Regulation. Accreditation involves an independent assessment by the National Accreditation Body (NAB) whether the verifier has the competence to carry out the verification, whether it can perform the verification in line with the M-AVR and whether it meets the requirements in Chapter III of the M-AVR **(Point 14)**. The accreditation process concludes with a decision on whether the verifier can be granted accreditation and is thus allowed to perform verification of shipping companies' reports. After the accreditation has been granted, the verifier is to be continuously monitored by the NAB through annual surveillance and a reassessment before the accreditation certificate expires. For this purpose, the verifier has to provide regularly information to the NAB (see section 7.1, **Point 15**).

The verifier carries out the various activities required by the M-AVR to check the implementation of the MP and the data in the shipping company's reports (ER or CER). Once the verifier has concluded on the verification of a report, it issues a verification report to the shipping company stating a verification opinion, i.e. whether the shipping company's report verified is satisfactory or not satisfactory, possibly accompanied by recommendations for improvements **(Point 8)**. For each end of year emissions report, the verifier will then issue a "Document of Compliance" (DoC) upon positive outcome of verification. This document has to be kept onboard the ship as a proof of compliance during port state inspections **(Point 9)**.

Before or at the latest on 31 March of each year[9], the shipping company must submit both the emission reports and the corresponding verification reports to the AA **(Point 10)**.

If the shipping company's report (ER or CER) is not verified as satisfactory, or is not submitted to the AA by the deadline, or is found to be non-compliant by the AA, the AA must take action, i.e. make a conservative estimation[10] of the emission data and take enforcement action **(Point 11)**[11]. For instance, the AA's spot checks on the report at company level may show that the report has not been verified by

---

[5] If the MP does not meet the requirements, the AA will request the shipping company to make the appropriate revisions of the MP.

[6] Where at the beginning of the reporting period the AA has not finalised the approval of the MP yet, the company shall nonetheless carry out the monitoring of relevant MRV data on the basis of the MP submitted to the AA, while considering the need of revisions to the MP following comments from the AA, potentially including data gaps treatment before submitting the ER.

[7] For details on which ships, GHGs and activities are covered by the MRV Maritime Regulation and the EU ETS, please consult Maritime Guidance Document No. 1.

[8] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and repealing Regulation (EEC) No 339/93 (Text with EEA relevance). Consolidated version: **http://data.europa.eu/eli/reg/2008/765/2021-07-16**

[9] AAs may require a shipping company to submit the verified emission report earlier than 31 March but the earliest by 28 February (Article 11 of the MRV Maritime Regulation).

[10] As defined in Article 3(l) of Regulation (EU) 2015/757, the estimation shall ensure that no under-estimation of annual emissions or over-estimation of distances or amounts of cargo carried occurs.

[11] Article 2 of Commission Delegated Regulation (EU) 2023/2849 as regards the rules for reporting and submission of the aggregated emissions data at company level provides the legal basis for the determination of emissions by the administering authority responsible: **http://data.europa.eu/eli/reg_del/2023/2849/oj**

a properly accredited verifier or that the verification was not carried in line with the M-AVR. It depends on the MS's procedures how and for how long these spot checks on the reports will be carried out.

By 30 September each year from 2025 onwards, the shipping company must surrender in the EU ETS Union Registry at least the number of emission allowances equivalent to the emissions covered by the EU ETS Directive as reported and verified in the company-level emission report (for more details, see Maritime Guidance Document No.1). **(Point 12)**.

The compliance cycle does not end with the surrendering of emission allowances by the shipping company. The AA may carry out checks on the data of the shipping company, and port authorities may carry out inspections at ships to ensure that the shipping company is complying with the MRV Maritime Regulation. Furthermore, the MRV Maritime Regulation contains explicit requirements for shipping companies to improve their monitoring methodology on a continuous basis and for shipping companies to address outstanding issues or recommendations for improvement that were identified by the verifier.

In addition, information exchange requirements are contained in the M-AVR to enable the AA and the NAB to exchange information between each other and to inform each other on their activities **(Point 16)**. For example, if the AA identifies significant errors in the verified emission report that have been missed by the verifier, this must be communicated to the NAB. If, on the other hand, the NAB suspends the accreditation of a verifier, the AA must be informed. These information exchange requirements between the various parties in the compliance chain will help each of them to carry out their own tasks more efficiently and effectively.

To ensure NABs carry out their activities in line with the M-AVR and maintain the quality requirements of accreditation to uphold the quality of verification activities, the M-AVR requires that the competence and performance of the NAB is being monitored. This monitoring is carried out by the MS that has appointed the NAB. In addition, a regular and independent peer evaluation is organised by the European Cooperation for Accreditation (EA)[12] to monitor the competence and performance of the NAB **(Point 13)**. In this peer evaluation process, experts from the EA, NABs and other parties assess whether the NAB under peer evaluation meets the requirements of the M-AVR.

2.2 Relation between legislation, harmonised standards and guidance

The MRV Maritime Regulation provides the legal basis for the M-AVR. Since the EU ETS relies on the procedures of the MRV Maritime Regulation, the M-AVR also applies to data necessary for the EU ETS for shipping companies. To ensure a common interpretation and application of the requirements in the legislation, the European Commission provides guidance documents on various issues of Maritime MRV and EU ETS. Since the Commission has also provided extensive and even more detailed guidance for the EU ETS for installations and aircraft operators, some of the maritime guidance refers also to those documents. For more information on the guidance documents prepared for the MRV Maritime Regulation, see section 1.3.

The M-AVR itself is closely linked to the general framework regulation on Accreditation (the AR[13]) that regulates accreditation of conformity assessment activities for all kinds of conformity assessments relevant to various EU legislations, not only for GHG emissions. Synergy between both regulations has been created by stating in the M-AVR that the general requirements of the AR automatically apply if these are not explicitly covered by the M-AVR.[14] In addition, the M-AVR adds specific points for EU ETS

[12] The European Cooperation for Accreditation (EA) is a regional body that is a member of the International Accreditation Forum. According to Article 56(2) of the M-AVR, the NAB must be a member of the EA.

[13] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and repealing Regulation (EEC) No 339/93; http://data.europa.eu/eli/reg/2008/765/2021-07-16

[14] See Article 16(2) of the MRV Maritime Regulation: "*Where no specific provisions concerning the accreditation of verifiers are laid down in this Regulation, the relevant provisions of Regulation (EC) No 765/2008 shall apply.*"

and Maritime MRV requirements to the general provisions of the AR (e.g. competence requirements for NAB personnel). The AR requires, where applicable, the use of harmonised standards.

The figure below outlines the interrelation between the different types of regulations, standards and guidance material.

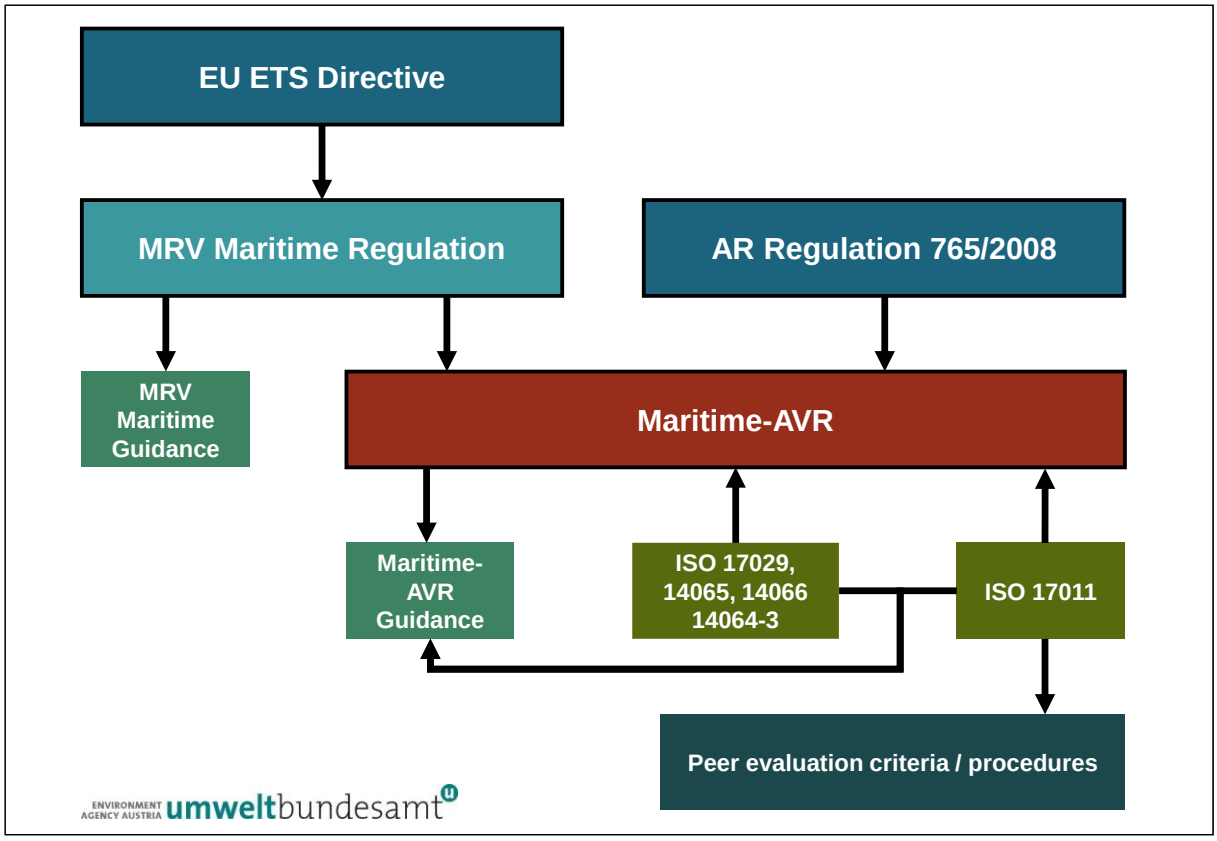

Figure 2: Interrelation between regulations, standards and guidance material

The M-AVR prescribes the application of a harmonised standard in the accreditation of verifiers and the assessment of their competence, i.e. EN ISO 14065 ("General principles and requirements for bodies validating and verifying environmental information"), a GHG programme-neutral standard (i.e. a general standard applicable to many different sectors, not specific to the monitoring of GHGs). This standard must be applied together with EN ISO 17029 ("Conformity assessment – General principles and requirements for validation and verification bodies"). NABs must use these standards on verification approach, competence, impartiality and procedures to assess the verifier's competence and performance. Because the ISO standard is not specific enough, the M-AVR provides, where necessary, specific details applicable to the EU ETS and MRV Maritime Regulation and is therefore a supplementing basis for accreditation. Similarly, a harmonised standard is prescribed for the NAB, i.e. EN ISO/IEC 17011 ("Conformity assessment – Requirements for accreditation bodies accrediting conformity assessment bodies"). The NAB must meet the requirements in this standard as well as the maritime-specific requirements in the M-AVR. Compliance with these requirements is regularly monitored by the MS and in the peer evaluations.

In addition to the set of guidance documents prepared by the Commission services the guidance documents prepared by the European Cooperation for Accreditation play an important role. As NABs participating in EU ETS Accreditation must be members of the EA, this implies NABs following the mandatory guidelines and procedures established by EA (for more information, please see the website[15] of the EA). Two documents are of particular interest:

- EA 6/03 (EA Document for Recognition of Verifiers under the EU ETS Directive);
- Peer evaluation criteria and procedures developed by the EA.

[15] https://european-accreditation.org/information-center/ea-publications/

3 VERIFICATION PRINCIPLES

The objective of verification is to ensure that emissions data have been monitored in accordance with the MRV Maritime Regulation and that reliable and correct emission data are being reported. This objective is underpinned by general verification principles and obligations laid down in Chapter III of the MRV Maritime Regulation.

To achieve the objective of verification and ensure that the verification is sufficiently robust and of high quality, the verifier has to check that a number of fundamental principles[16] have been met, i.e. the principles of completeness, consistency, comparability, accuracy, integrity of the methodology and continuous improvement.[17] It is the task of the verifier to ensure that the verified report "*shall represent faithfully that, which it either purports to represent or may reasonably be expected to represent.*"[18]

3.1 Reliability of verification

The fundamental principle is the requirement that a verified company's report (whether ER, partial ER or CER) is reliable for its users (i.e. that it is a faithful representation of reality), which include or may include the Administering Authorities (AAs), shipping companies, verifiers, accreditation bodies, the general public or other parties.

The importance of this principle can be explained by its relationship to the statement of the verifier that the emissions are correct and free from material misstatements. In order to be faithful and therefore reliable, the shipping company's report must not contain material misstatements. Material issues are determined by the outcome of the evaluation of the other principles – is the report or its supporting data complete, consistent, accurate, based upon integrity and comparable over time? Or are there material issues related to any or all of these principles?

Failure to comply with all or any of these principles is likely to affect the reported data; it may lead to material misstatement(s) and therefore to non-conformity with the key principle of reliability.

Whereas these principles are crucial to assess whether the report involves a fair representation of the emissions, the principle of transparency may be less likely to have a direct material effect on the data. However, this does not mean that this principle is less important than the other monitoring and reporting principles. Failure of the shipping company to obtain, record, compile, analyse and document data in a transparent manner can still affect the reliability of the shipping company's report. In such a case, it requires that the verifier carries out significantly more work to ensure that it has a sufficiently detailed and precise understanding of how the shipping company's monitoring and reporting system functions in order to be able to carry out the verification activities. Similarly, continuous improvement of the shipping company's monitoring and reporting system is an important supporting principle: if the verifier and/or the shipping company identifies opportunities to strengthen the system and make it more robust, this must be done in order to reduce the opportunity for misstatement and non-conformity[19] with the MRV Maritime Regulation.

---

[16] These principles apply to all MRV systems for GHGs, since they are based in the IPCC guidelines for national GHG inventories.

[17] The principles of completeness, consistency, comparability, accuracy, integrity of the methodology, transparency and continuous improvement have been laid down in Article 4 of the MRV Maritime Regulation. If the verifier identifies during the verification that one of these principles have not been met, e.g. the list of emissions sources is not complete, the verifier notes this in the verification report.

[18] Article 6 of the AVR for installations and aircraft operators.

[19] 'Non-conformity' is defined in Article 2(5) of the M-AVR. It actually also encompasses cases of non-compliance (i.e. when legal requirements are not fulfilled).

3.2 Independence of the verifier

Independence and impartiality of the verifier are key requirements and the pre-condition for accreditation. In order for the AA to have confidence in the accuracy of the reported data and the verified emissions, and for the overall credibility of the MRV system, it is crucial that the verifier is independent of the shipping company. This means that the verifier must not only refrain from being a shipping company but also have no relations to the shipping company which might impact its impartiality and independence. In addition, the verifier must be independent from the AA that is responsible for the implementation and compliance of EU ETS. There should be no conflict of interest of the verifier in its relation with the AA. Article 45 M-AVR contains specific requirements on the impartiality and independence of the verifier from the shipping company that further elaborate on the key requirements laid down in Article 14(1) of the MRV Maritime Regulation. For more information on those specific requirements, please see section 5.2 of this guidance.

3.3 Professional scepticism

A verifier has to carry out its activities in a sound and objective professional manner. ISO 14065 uses the term of "professional scepticism"[20] for the general attitude, which is also used in AVR. Applying such professional scepticism and exercising due professionalism have to be key traits of a verifier. This implies for example that the verifier should not automatically accept the evidence obtained during the verification, but the verifier should analyse this evidence thoroughly in line with the required level of assurance. At all times the verifier has to be aware that circumstances may exist that cause the information in the emission report to contain material misstatements. This attitude is, in short, open-mindedness, awareness, free of prejudice.

3.4 Reasonable level of assurance

The role of verification is fundamental for creating assurance on the accuracy of the data in the shipping company's report. The degree of assurance that the verifier gives in its verification statement[21] on the accuracy of data relates to the depth and detail of verification. According to auditing standards, two levels of assurance are used in assurance engagements[22]:

- Reasonable level of assurance meaning a high but not absolute level of assurance that the subject matter conforms in all material aspects with the required criteria;
- Limited level of assurance meaning a moderate level of assurance that the subject matter is plausible in the circumstances. As explained below, this level of assurance is insufficient to meet MRV standards.

Each level has a different impact on the nature, timing, and depth of verification activities. The level of assurance obtained in a limited level of assurance engagement is significantly lower than in a reasonable level of assurance engagement. The extent of verification activities carried out to satisfy the requirements of a limited assurance engagement is therefore less detailed than if the engagement is carried out to satisfy a reasonable level of assurance. In the case of limited assurance, the scope and depth of the audit activities are narrower, meaning that the risk is higher that misstatements are not found. For

[20] Professional scepticism (in the context of ISAE 3000): "*An attitude that includes a questioning mind, being alert to conditions which may indicate possible misstatement, and a critical assessment of evidence.*"

[21] As a verification report can be an exhaustive document listing a lot of findings, each verification report contains a central, well identifiable verification statement, sometimes referred to as "verification opinion statement" which clearly summarizes whether the report has been verified as satisfying, or whether the result of verification is negative. See section 4.2.15, Table 3.

[22] International standard on assurance engagements ISAE 3410, assurance engagements on greenhouse gas statements.

example, in a reasonable level of assurance engagement, the verifier will check the data flow and the control activities that the shipping company has implemented, to assess the risk of misstatements; a limited level of assurance would not necessarily involve the testing of control activities. The difference between the levels of assurance is reflected in the manner in which the verification statement is worded. A statement expressing reasonable level of assurance is phrased in positive wording[23], a statement expressing limited assurance uses a double negative phrasing[24].

The MRV Maritime Regulation (Article 13(3)) requires the level of assurance for EU ETS verification to be reasonable. This means that the verifier has to plan and perform the verification in such a way that it can state with reasonable assurance that the emission report, partial emissions report or emissions report at company level is free from material misstatements. The effort required from the verifier to state with reasonable assurance that the emissions have been determined with a high degree of certainty, is significant. To be able to give such a statement, the verifier has to obtain sufficient evidence during the verification process[25]. Such evidence can for example be gathered through:

- Obtaining the necessary understanding of the information mentioned in Articles 4, 10 and 24 of the M-AVR;
- Continually assessing the risks of material misstatements and adapting the verification activities and procedures accordingly;
- Determining the nature, timing and extent of further verification activities such as testing, sampling, data verification and other verification procedures;
- Carrying out the activities in the process analysis such as data verification and analytical procedures.

3.5 Materiality

Materiality is a key element of verification. It is important in two respects. The concept itself is relevant when the verifier determines the nature, timing and extent of verification activities. The planning and design of these activities is based on the assessment of the risks of misstatements and non-conformities and any likely material effect they may have on the reported data. Secondly, materiality is essential in concluding whether an emission report can be verified as satisfactory. Only reports that are free of material misstatements can be regarded as satisfactory.

It is important to note that materiality is not a tolerance band: every identified misstatement and non-conformity must in principle be corrected by the shipping company before finalisation of the verification[26]. Materiality is just a tool for the verifier to aid its judgment and decision-making, and to conclude on the verification opinion.

Section 4.4.4 provides further guidance on the situations in which misstatements should be considered as material. The role of materiality in sampling data and the testing of control activities as well as the design of other verification activities is discussed in KGN II.4 on sampling. Examples on sampling by the verifier are furthermore given in the Annex of this document, section 8.6.

---

[23] E.g.: The GHG statement is free of material misstatements and prepared, in all material aspects, in accordance with the applicable criteria.

[24] E.g.: Nothing has come to the auditor's attention that causes the auditor to believe, on the basis of the procedures performed, that the GHG statement is not prepared, in all material aspects, in accordance with the applicable criteria.

[25] Reasonable assurance is not an absolute assurance. Reducing the verification risk to zero is not attainable or cost beneficial because of, for example, the selective use of testing, the inherent limitation of control activities, the fact that much of the evidence available to the verifier is persuasive rather than conclusive and the fact that judgment is used in gathering and evaluating evidence and forming conclusions based on that evidence.

[26] This however does not prevent the verifier from positively verifying an emissions report containing non-material misstatements, in particular where removing the misstatement would require an alternative data source, which in some cases may not be available.

3.6 Scope of verification

The scope of verification is defined by the tasks the verifier must perform to achieve the objective of verification, i.e. to ensure that relevant data have been monitored in accordance with the MRV Maritime Regulation and that reliable and correct data are reported[27].

MRV Maritime Regulation Art. 13(2) requires "*The verifier shall assess the conformity of the emissions report and the report referred to in Article 11(2) with the requirements laid down in Articles 8 to 12 and Annexes I and II."* Accordingly, the verification scope is understood as including checking:

- Whether the shipping company has carried out the monitoring of the ship's data in accordance with the monitoring plan (MP) as approved[28] by the administering authority (AA);
- The completeness of reported data[29], meaning:
  - Completeness of voyages and port calls covered;
  - Completeness of all data required throughout the reporting period (fuel consumption and emissions, freight/passengers transported, energy efficiency, etc.);
  - Completeness of per-voyage and annual data as required by the MRV Maritime Regulation;
- Whether the data flow and control activities work satisfactory as given in the monitoring plan;
- That the emissions have been calculated correctly based on underlying data.

In other words, the verification is not the confirmation of a single number (the total emissions in the reporting period), but includes the confirmation of the ship's (or shipping company's) compliance with the MRV Maritime Regulation. Consequently, following verification of the ships' emissions reports, the issuance of a "Document of Compliance" in accordance with Article 17 of the MRV Maritime Regulation is within the tasks of the verifier.

Supporting information on the scope of verification activities can be found in the key guidance note on the scope of verification (KGN II.1). It provides detailed guidance[30] on:

- What elements the verifier needs to assess during the verification;
- The extent to which the verifier needs to check compliance with the legislation;
- What the verifier must do if there is no approved[31] MP, if the MP has not been updated or if the MP does not reflect the actual situation of the ship (installation); and
- What a verifier must do if it has identified non-compliance with the legislation.

[27] While the verifier will most likely focus on emissions data, all data reported under the MRV Maritime Regulation fall under the scope of the verification, as referred to in Article 15 of the M-AVR. The verifier should in particular further check the reliability and accuracy of reported activity data different from emissions (e.g. transport work data) or the data identifying the ship and the shipping company, which should be identical to the identification in the underlying MP(s).

[28] Or as positively assessed by the verifier, for those ships not falling within the EU ETS scope.

[29] For an overview of data to be monitored and reported please see Maritime Guidance Document No. 1.

[30] That guidance document is focussed on installations. Its content is mostly non-essential for verifiers on the maritime sector. However, as it gives a systematic approach to the scope of GHG verification, it helps to understand the overall approach.

[31] For installations the process is different insofar as the approval of MPs is the sole responsibility of the competent authority, and the verifier is not involved.

4 VERIFIER'S ACTIVITIES UNDER THE MRV MARITIME REGULATION

The M-AVR details the tasks assigned to the verifiers within the MRV compliance system. This guidance document follows the structure of the M-AVR in detailing such tasks, which are presented in the following logical sequence:

- Assessment of ships' monitoring plans (Article 6(1) of the MRV Maritime Regulation), as discussed in section 4.1;
- Verification of ships' Emissions Reports (ERs), which includes both annual ERs and partial emissions reports (pursuant to Article 11(2) of the MRV Maritime Regulation in case of change of shipping company) to which the same approach is applied, as discussed in section 4.2;
- Verification of Company-level Emission Reports (CERs), containing aggregated emissions data at company level pursuant to Article 11a of the MRV Maritime Regulation, containing the data relevant for the EU ETS, in particular for surrendering allowances. This verification which builds on the prior verification of individual ships' ERs is described in section 4.3.

The most comprehensive guidance on the verification process in general is given in section 4.2 on ships' ER verification, as this is the core process for verifiers under the MRV Maritime Regulation. Activities described in sections 4.1 and 4.3 differ from the "default" verification as follows:

- Assessment of MPs (4.1) is not a verification, but a *validation* according to the terminology set in relevant standards[32]. Therefore, the M-AVR does not require the same steps for the assessment of a monitoring plan compared to for a verification of emissions reports.
- Verification of CERs (section 4.3) builds strongly on the ERs already verified before. The MRV Maritime Regulation makes clear that a repetition of those verifications is to be avoided[33]. However, the verifier may still have to carry out checks on individual ships' verification reports or emission reports, if such checks are necessary for achieving reasonable assurance and for judging if misstatements in the CER are material.

4.1 Assessment of Monitoring Plans

Shipping companies must develop a monitoring plan (MP) for each of their ships carrying out activities within the scope of the MRV Maritime Regulation[34] and submit it to for assessment to an accredited verifier. The assessment of the MP carried out by the verifier plays an important role in the compliance cycle, as it will be taken into due account for the approval process by the Administering Authority. Only once the Monitoring Plan has been positively assessed by the verifier, the shipping company will be able to progress in the workflow, by submitting the MP to the Administering Authority[35].

[32] ISO 14065:2020 defines: "*verification process for evaluating an environmental information statement <u>based on historical data and information</u> to determine whether the statement is materially correct and conforms to criteria*." The check of monitoring plans does not refer to historical data, and therefore is more in line with the definition of a <u>validation</u>: "*process for evaluating the reasonableness of the assumptions, limitations and methods that support an environmental information statement about the outcome of future activities*."

[33] Article 15(6) of the MRV Maritime Regulation: "*In respect of [CERs]… The verifier shall not verify the emissions report and the report referred to in Article 11(2) of each ship under the responsibility of the company*."

[34] Art. 2 of the MRV Maritime Regulation specifies the scope of the regulation. Maritime Guidance Document No.1 provides extensive guidance on this scope. Note that any ship registered in THETIS-MRV should have an up-to-date monitoring plan.

[35] Where the ship falls under the Maritime MRV scope but outside the EU ETS scope, the Monitoring Plan shall also be submitted to the Administering Authority but no approval will be required.

4.1.1 Information to be provided by the shipping company

In order to enable the verifier to carry out its assessment of the MP, shipping companies must provide the verifier with sufficient information so that it can plan and carry out the assessment of the MP. The M-AVR outlines the minimum information to be submitted to the verifier in Article 4 of the M-AVR:

- The Monitoring plan itself: It is to be provided in English and using a template according to Implementing Regulation (EU) 2023/2449[36];
- Access to all relevant documentation, procedures and processes established outside of the MP to which reference is made in the MP, such as emissions sources certificates, plans of the ship indicating the position of instruments, flow charts for data flow steps;
- An outline of the shipping company's control system and its risk assessment;
- Any documents relevant to changes of the monitoring plan and the said systems;
- If a person or organisation other than the shipowner have assumed responsibilities under the MRV Maritime Regulation and the EU ETS from the shipowner, documentary evidence that this organization or person has been mandated by the shipowner to comply with these obligations. This evidence, usually referred to as 'the mandate', needs to include the information listed in Article 4(3) of the M-AVR[37].

In addition, the verifier may request any other information deemed relevant to the assessment of the plan. In such cases, the shipping company has to provide that information.

4.1.2 Assessment of the monitoring plan

When assessing the monitoring plan, the verifier needs to apply the principles of verification mentioned in Chapter 3 of this guidance in checking the conformity of the MP with the MRV Maritime Regulation. It is to be noted that this activity deviates from the definition of a verification activity and rather qualifies as a *validation* task[32]. Article 5(2) of the M-AVR describes the essential checks that the verifiers shall implement when carrying out the MP assessment:

- Check that the shipping company used the appropriate template for the monitoring plan[38] and that all mandatory fields were duly filled in (i.e. perform a completeness check)[39];

---

[36] The template is implemented in THETIS-MRV, the IT system [use definition provided in GD1].

[37] "*The document shall be signed by both the shipowner and that organisation or person.*
If that document is in a language other than English, an English translation shall be provided.
The document shall include the following information:
(a) the name and the IMO unique company and registered owner identification number of the organisation or person mandated by the shipowner;
(b) the country of registration of the organisation or person mandated by the shipowner, as recorded under the IMO Unique Company and Registered Owner Identification Number Scheme;
(c) the name and the IMO unique company and registered owner identification number of the shipowner;
(d) the following information for the shipowner's contact person:
(i) first name,
(ii) last name,
(iii) job title,
(iv) business address,
(v) business telephone number,
(vi) business email address;
(e) the date of application of the mandate from the shipowner to that organisation or person;
(f) the IMO ship identification number of the ship."

[38] In accordance with Implementing Regulation (EU) 2023/2449.

[39] The relevant electronic template is implemented in THETIS-MRV. The verifier should in particular check whether any field of the monitoring plan is missing, incomplete, or incorrectly marked as Not Applicable (N/A).

- Make sure that the shipowner and the country of registration of the company indicated in the MP are identical to the registered owner and the company's country as recorded under the IMO Unique Company and Registered Owner Identification Number Scheme;
- Ensure that the shipping company has been duly mandated by the shipowner, in the cases where a mandate is required, by checking the presence, completeness and correctness of the required documentary evidence[40];
- Verify that the information provided in the MP, in terms of emissions sources, installed measuring equipment, applicable systems and procedures, provide for an accurate and complete description[41] of the system put in place by the shipping company to monitor and report what required by the MRV Maritime Regulation;
- If the shipping company seeks to use the derogation[42] from the general obligation under MRV Maritime to monitor relevant parameters on a per voyage basis, check that the MP foresees adequate monitoring arrangements, taking into account necessary information for the reporting of emissions under the EU ETS, in particular where voyage-specific information is required[43].
- Check that the procedures referenced in the MP and implemented as part of the ship's management systems or covered by harmonised relevant quality, environmental or management standards are suitable for the purpose of monitoring and reporting within the MRV Maritime Regulation.

It is worth noting that the list of checks provided under Article 5(2) of the M-AVR sets only minimum standards for the verifier's assessment, which does not prevent the verifier from carrying out any additional check for the purpose of evaluating whether the information provided in the MP meet the assertions of completeness, accuracy, relevance and conformity with the MRV Maritime Regulation[44].

4.1.3 Site visit for MP assessment

Article 6 of the M-AVR requires the verifier to carry out site visits to the shipping company at one or more appropriate times during the assessment of the MP. Site visits are crucial to determine whether the Monitoring Plan effectively describes the actual methodology for monitoring and reporting emissions implemented by the shipping company and to evaluate whether the applied data flow and control system complies with the requirements of the MRV Maritime Regulation. During a site visit the verifier may for instance, check the correct operation and location of measurement devices, the adequacy of control activities, the completeness of the emission sources installed on board the ship.

The site visit does not necessarily need to be carried out onboard the ship as the verifier should determine the site location considering where the critical mass of relevant data is stored[45] and where dataflow and control activities are carried out. The location of a site visit could for instance be identified onshore, at the shipping company headquarters or any other premises. Furthermore, the verifier may also decide that a site visit should include multiple locations, for instance both on shore and on board ships, when visiting a single location does not allow to complete the assessment of the MP. The verifier

---

[40] As referenced in Article 4(3) of the M-AVR.

[41] The accuracy and the completeness of what is described in the monitoring plan should be assessed across the different sections of the MP. Omitting some of the emissions sources installed onboard (e.g. emergency generators) would for instance negatively affect the completeness of the MP and providing only high-level and general descriptions of implemented procedures would jeopardise its accuracy.

[42] Pursuant to Article 9(2) of the MRV Maritime Regulation.

[43] This is what is meant by "information referred to in Article 10, point (k) of the MRV Maritime Regulation": That point (k) is: "*total aggregated emissions of greenhouse gases covered by Directive 2003/87/EC* [the EU ETS Directive] *in relation to maritime transport activities in accordance with Annex I to that Directive and to be reported under that Directive, together with the necessary information to justify the application of any relevant derogation from Article 12(3) of that Directive provided for in Article 12(3-e) to (3-b) thereof.*"

[44] That could include for instance checks on any other relevant data identifying the ship and the company, such as the ship type or the ice-class of the ship.

[45] This includes copies. In the case where the relevant copies are stored onshore, a visit on board the ship where the originals are kept may for instance become unnecessary.

should also determine the specific activities to be carried out during the site visit, as well as its duration, taking into due account relevant circumstances, e.g. the complexity of the MP, its prior knowledge of similar vessels, or any preliminary assessment based on the MP submitted by the company.

Virtual site visits

While site visits should be normally understood as physical site visit taking place in person, under specific conditions, the M-AVR foresees the possibility to have a site visit for the purpose of MP assessment to be conducted virtually[46]. These conditions include:

(a) the verifier has sufficient understanding of the ship's monitoring and reporting systems;

(b) the nature and complexity of the ship's monitoring and reporting systems do not require a physical site visit;

(c) the verifier is able to obtain and access all relevant information remotely;

(d) serious, extraordinary and unforeseeable circumstances, outside the control of the shipping company, prevent the verifier from carrying out a physical visit, even when using all reasonable efforts to overcome these circumstances.

Should any of the above conditions be met, the verifier may carry out a virtual site visit, e.g. carry it out by video conference with any additional digital exchanges/follow-ups. For that purpose the verifier will request the shipping company to provide all necessary information electronically, and/or by visiting relevant parts of the ships during the video conference. If during the virtual site visit the verifier does not obtain all necessary evidence for positively assessing the monitoring plan, the verifier has to consider to carry out a physical site visit. Also after a physical site visit there may remain issues for which to solve the verifier has to carry out further site visits (including at different locations than previously visited sites). If for example the information on individual ships' measuring instruments is not available at the on-shore office visited, the verifier may decide that a site visit onboard the ship is necessary to complete the assessment.

Waiving of site visits

Should the above conditions (a) to (c) be fulfilled cumulatively, and if the verifier can carry out the assessment of the MP assuming that reasonable assurance can be achieved, the verifier may waive the site visit, in which case the site visit will not take place neither in person nor in virtual mode. However, such a waiver cannot apply if the MP is assessed for the first time by that verifier or if there have been significant modifications of the MP[47].

In the case of a site visit being carried out virtually or being waived, the verifier has to inform the shipping company of this decision without delay and take measures to reduce the verification risk to an acceptable level. The overarching rule for the verifier's consideration on site visits must be that reasonable assurance must be reached that the MP is in conformity with the MRV Maritime Regulation. As has been explained in section 3.4, reasonable assurance requires thorough checking.

---

[46] Article 6 of the M-AVR contains specific rules and conditions on virtual site visits in respect of the monitoring plan. Unless a site visit is referenced to as a virtual site visit in this document, it shall be meant as a physical, in person, site visit.

[47] Such changes should encompass those listed in Article 7(2), points (b) to (e), of the MRV Maritime Regulation:

(b) where new GHG emissions occur due to new emission sources or due to the use of new fuels not yet contained in the monitoring plan;

(c) where a change in availability of data, due to the use of new types of measuring equipment, new sampling methods or analysis methods, or for other reasons, may affect the accuracy of the determination of GHG emissions;

(d) where data resulting from the monitoring method applied has been found to be incorrect;

(e) where any part of the monitoring plan is identified as not being in conformity with the requirements of this Regulation and the company is required to revise it pursuant to Article 13(1).

The justification for the decision for any virtual or waived site visit has to be recorded in the internal verification documentation. The verifier's conclusions should also include information on site visits, on the reasons for conducting virtual site visits or the reasons for waiving them.

4.1.4 Addressing non-conformities

An essential element of the assessment process is addressing all non-conformities that might be found by the verifier. A non-conformity in the MP could be for instance triggered by some compulsory fields of the MP template not being filled in by the shipping company. Further guidance on the issue of non-conformities can be found in chapter 4.4.

4.1.5 Independent review

Similarly to other verification processes, an independent review is required as the verifier's key quality assurance measure. For that purpose, the verification team submits the draft conclusions and internal verification documentation to a reviewer who has not participated in the assessment of the MP, and who is competent for such review. The objective of this review is to ensure that the MP has been assessed in accordance with the M-AVR and that professional care and judgement have been exercised. To carry out this activity, the scope of the independent review needs to encompass the entire assessment process. The results of the review have to be included in the internal verification documentation.

4.1.6 Verifier's conclusions

Based on the information collected during the assessment the verifier must provide the shipping company with the conclusions reached in a timely manner. These conclusions need to include the following (Article 9 of the M-AVR):

- A statement whether the MP is assessed as being in conformity with the MRV Maritime Regulation, the EU ETS Directive (where applicable), the relevant templates[48] and other relevant regulation;
- A description of uncorrected (non-material[49]) non-conformities, if any;
- A summary of the verifier's procedures, including information on site visits, on the reasons for conducting virtual site visits or the reasons for waiving them;
- A summary of changes to the monitoring plan during the reporting period concerned if there have been any;
- Any other elements found during the assessment.

The verifier's conclusions should indicate the date of assessment and a reference to the relevant MP, including the IMO identification number of the ship.

4.1.7 Assessment of MP changes

Article 7(1) of the MRV Maritime Regulation requires the shipping company to check regularly (at least once a year) for whether the ship's MP still reflects the nature and functioning of the ship and whether the monitoring methodology can be improved. If improvements are made according to Article 7(2) of

[48] See in particular Implementing Regulation (EU) 2023/2449.

[49] See section 4.4 for the concept of materiality and examples. In context of MP assessment, mostly qualitative criteria for materiality will apply, as no actual data are under assessment. An exception would be for example uncertainty assessments which may build on estimations of annual emissions.

said regulation, or if other relevant changes (see footnote 47) are made by the shipping company, the company must modify the monitoring plan correspondingly. Examples for such modifications are:

- a change of emission sources;
- change of monitoring method or backup method;
- new fuels used;
- use of new types of measuring equipment;
- changes in the management system impacting relevant data.

These modifications then have to be notified to the verifier and require a reassessment of the MP by the verifier, applying the same process as described in sections 4.1.1 to 4.1.6. It is also possible that the MP change does not require a re-assessment, e.g. where measuring instruments of the same type are simply exchanged, minor changes in procedures are made, etc. Where the shipping company wants certainty, it is best to submit the MP for assessment, and give the verifier the option to decide on the need for assessment.

4.1.8 Retroactive assessment

If a ship sails to any EU port[50] of call for the first time and has not yet submitted a monitoring plan for instance because the shipping company did not foresee such voyages, a backward assessment of the ship's monitoring plan might be necessary. The following section depicts two such scenarios.

Scenario 1: First voyage into EU ("newcomer")

According to Article 6(2) of the MRV Maritime Regulation, *"for ships falling under the scope of this Regulation for the first time…, the company shall submit a monitoring plan to the verifier without undue delay and no later than two months after each ship's first call in a port under the jurisdiction of a Member State".* Furthermore, according to Article 6(7) of the MRV Maritime Regulation, the company *"shall submit a monitoring plan in conformity with the requirements of this Regulation* [i.e. already positively assessed by a verifier] *to the administering authority responsible without undue delay and no later than three months after each ship's first call in a port under the jurisdiction of a Member State."*

Scenario 2: Change of shipping company for ships in compliance

This scenario relates to Article 7(2) point (a) of the MRV Maritime Regulation, which prescribes that companies shall modify the monitoring plan where a change of company occurs. Changes in shipping companies may lead to several other changes with impacts on the monitoring plan, e.g. new distribution of responsibilities within the staff, the use of different IT systems and different control procedures[51]. Therefore, the new shipping company shall make all relevant updates to the MP as quickly as possible and seek assessment of the modified monitoring plan by the verifier without undue delay.

In both scenarios the overarching issue relates to time as companies are required to start monitoring emissions and other required data[52] without the support of an assessed (and approved) monitoring plan.

[50] "EU port" – like the term EU Member States – is understood in this document to include ports and countries of EFTA (Island, Norway) and their ports. More guidance on the scope of the MRV Maritime Regulation and maritime transport activities falling under the EU ETS is given in Guidance Document No.1.

[51] Note that before the introduction of the concept of "partial emission reports" by the 2023 amendment of the MRV Maritime Regulation, a change of company also included the risk of a loss of data. However, the shipping company responsible for the ship before the change of company now has to provide all relevant data in the partial emission report pursuant to Article 11(2) of the MRV Maritime Regulation to the new company.

[52] Such as fuel consumption, transport work, etc.

Under Scenario 2, the submission of the monitoring plan to the verifier shall be done without undue delay and under scenario 1 no later than two months after the ship's first call in a port under the jurisdiction of a Member State. The development of the monitoring plan in a short period of time is possible in principle, and the assessment by the verifier should also be possible swiftly, if the MP is well prepared. Another question, however, is the actual monitoring of emissions and other data before the monitoring plan has been developed, assessed, and where applicable, approved by the administering authority. This may require the application of estimation methodologies to fill in the data gaps (see section 4.2.8).

From the moment the shipping company has developed and submitted its MP to the verifier, it should start applying the MP, assuming that it will be assessed positively. If the verifier recommends improvements, or if the administering authority requests changes to the monitoring plan, the shipping company should implement those changes as quickly as possible and assume they will be approved. In case of doubt, the operator should carry out monitoring in accordance with both the old and updated MP, and eventually discard the data that is not based on the approved MP as soon as the approval is given[53].

4.2 Verification of emissions and partial emission reports

The verification process of emissions reports and partial emissions reports consists of a number of interconnected and interdependent mandatory steps. This means that findings during the verification process can result in the need to reconsider one or more steps taken earlier in the verification process and subsequently adjust those steps. The steps of the verification process are described in Figure 3.

Before or at the latest on 31 March[54] each year, the shipping company has to submit the verified emissions report (ER) for each ship together with its corresponding verification report to the AA and the flag State concerned (if it is an EU Member State). Similarly, in case of change company, the (previous) shipping company has to provide a verified "partial emissions report" in accordance with Article 11(2) of the MRV Maritime Regulation no later than three months after completion of the change to the new company and the AA[55]. In order for the ER deadline to be met, it is important for shipping companies to start the process of reporting and for the verifier to start the verification early to avoid shortage of resources for last minute work in February and March when significant demands on shipping companies, verifiers, NABs[56] and AAs could delay the production of the final shipping company's report (CER) and the verification report.

It is furthermore recommended that the verification process starts during the year being reported on, rather than after the year has ended, as this facilitates checking of conformance and compliance, the timely management of issues and addressing possible data gaps, misstatements or non-conformities identified during the verification. However, sufficient data is needed to initiate the process, and any subsequent changes to the shipping company's systems must be considered well in time for the verified report to be submitted by 31 March[54]. By the end of the verification, the data for the whole reporting year must be verified.

[53] M-AVR Article 78 on record keeping.

[54] Administering Authorities may require a shipping company to submit the verified emission report earlier than 31 March but the earliest by the 28th of February (Article 11(1) of the MRV Maritime Regulation).

[55] Further recipients of that report are the flag state, if it is a Member State, and the Commission.

[56] National Accreditation Bodies

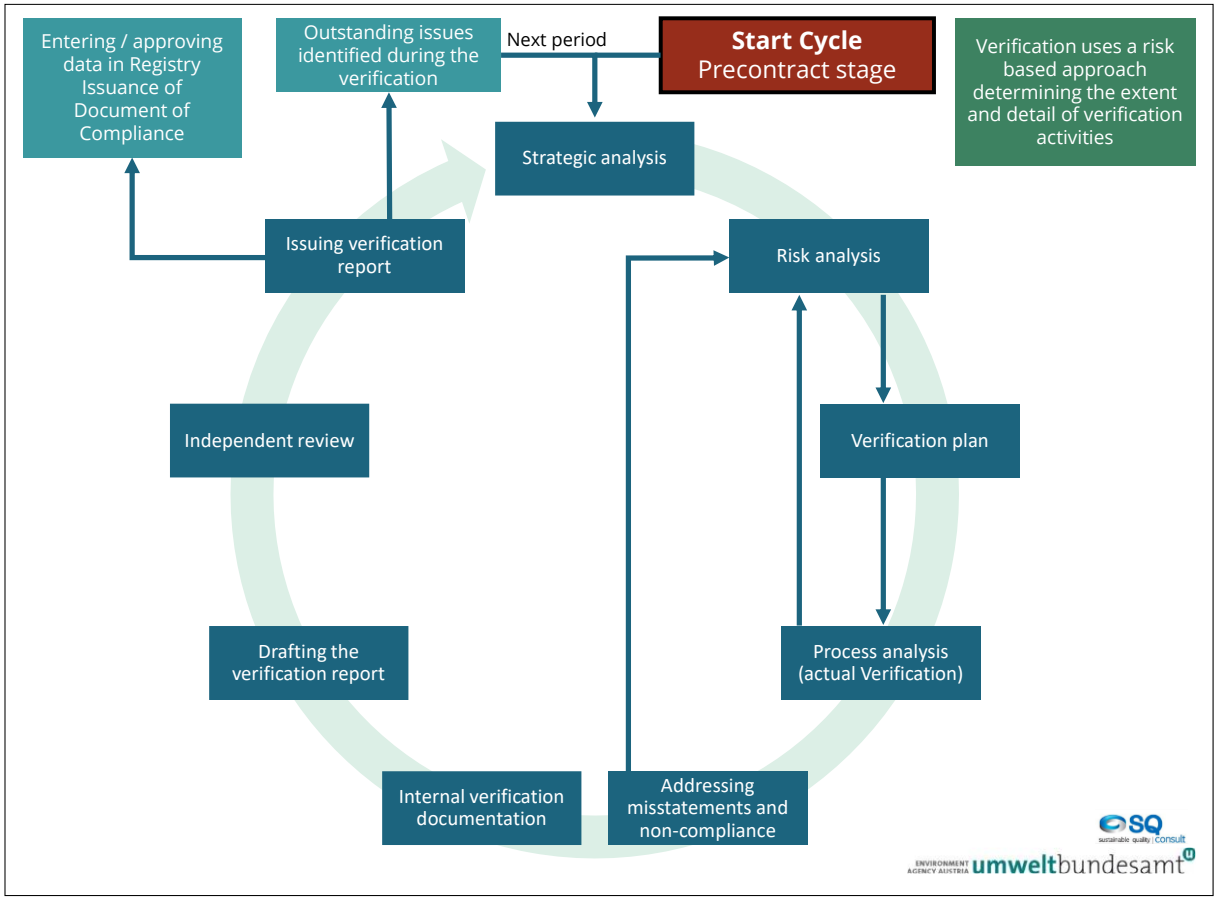

Figure 3: Verification process of emissions reports and partial emissions reports

4.2.1 Pre-contract stage

Shipping companies are recommended to contract MRV accredited verifiers already early during the reporting year to give the verifier flexibility for planning their activities (including for audits by the NABs). The pre-contract stage is a most important initial phase that precedes the verification process. At this stage, i.e. before accepting the verification engagement, the verifier should assess whether it can undertake the verification for that specific shipping company. This involves the following activities of the verifier:

- Evaluate the risks involved in undertaking the verification. The verifier should, in particular, consider:
  - The ship's MP and emissions report (if already available for the current year, otherwise the previous year's report) to see what risks are involved in undertaking the verification engagement;
  - potential risks to impartiality and independence of the verifier;
  - risks involved in terms of time allocation to the verification engagement;

  This evaluation should be fully documented in the internal verification documentation and should show how that the verifier has addressed these business risks in the contract with the shipping company, as well as how these risks have been mitigated: e.g. by allocating, if needed, more time to the particular verification engagement, by developing clear and transparent conditions in the contract.
- Undertake a review of the information supplied by the shipping company. The M-AVR requires the shipping company to provide the verifier with relevant information to enable it to perform the activities

of the pre-contract stage. Relevant information includes, for example, last year's emissions report and the ship's MP.

- Assess whether it has the competence, personnel and resources required to select a verification team for this specific verification engagement and to complete the verification activities successfully within the timeframe required. This assessment is highly dependent on the type of shipping company and its ships and activities. The verifier should have sufficient personnel within its organisation or through contracting to be able to cover the requirements for team composition. More information on competence and verification team requirements in provided the key guidance note on competence (KGN II.7).
- Determine the time allocation needed to properly carry out the verification. The verifier should ensure that the scope of the verification work and the time allocated in the contract is consistent with the risks identified. Insufficient contracted time must not lead to reducing the work needed to satisfactorily complete the verification in line with its risks.

Time allocation

The M-AVR does not provide rules for verifiers on allocating time. The verifier has to apply its expert judgment and experience from similar engagements, taking into account the specific situation (as also documented in the MP) of the ship(s) and the shipping company's maritime transport activities. The time allocated is not a fixed number. If during the detailed verification, the verifier finds that additional time is needed to properly carry out the necessary verification activities, the time allocation in the contract must be adjusted accordingly. The contract must have a provision for this adjustment.

4.2.2 Information to be provided by the shipping company

The shipping company must provide the verifier with sufficient information so that it can plan and carry out the verification of emissions reports and partial emissions reports. The M-AVR outlines which information needs to be submitted during the pre-contract stage and the actual verification activities:

1. A list of voyages that were carried out by the ship during the reporting period, or during the time the ship was under the responsibility of the shipping company for partial emissions reports;
2. In the case that any data gaps occurred during the reporting period, the circumstances and reasons for these data gaps as well as the number of voyages for which these data gaps occurred. Furthermore, the shipping company must inform the verifier about the applied estimation method for surrogate data and the amount of emissions calculated using that surrogate data;
3. The monitoring plan applied as well as the conclusions of the MP assessment and evidence of approval by the AA of said plan, if relevant.
4. If the verification of the emissions report for the previous year was carried out by another verifier, a copy of that report.
5. If deemed relevant by the verifier, copies of the following:
   - the ship's official logbook;
   - the oil record book (if separate);
   - bunkering documents;
   - if relevant, certificates concerning the determination of emission factors for the fuels used;
   - any documents on the number of passengers transported, amount of cargo carried, distance travelled and time spent at sea during the reporting period.
6. Additionally, verifiers may ask the shipping company to provide any other information relevant, in particular, if applicable:

- an overview of the IT systems used, showing the data-flow for the relevant ship;
- evidence of the maintenance and accuracy/uncertainty of measurement equipment/flow meters (e.g. calibration certificates);
- an extract of fuel consumption activity data from flow meters;
- copies of evidence of fuel tank meter readings;
- an extract of activity data from direct emissions measurement systems;
- any other information relevant to the verification of the emissions report or partial emissions report[57].

4.2.3 Strategic analysis

At the start of the verification process, the verifier shall carry out a strategic analysis of all relevant activities of the shipping company concerning the ship for which the ER or partial ER is verified. This analysis enables the verifier to understand the ship's activities and assess the likely nature, scale and complexity of the verification activities to be performed. It also provides input for the next verification step, i.e. the risk analysis. As a minimum, the verifier shall take into account the information gathered under points 1 to 5 listed in section 4.2.2 from the shipping company, and the elements listed in Article 11(3) of the M-AVR (Table 1). The examples in Table 1 give an indication of the possible factors that could be relevant when considering these elements.

Table 1: Relevant elements for the strategic analysis

Element in article 11(3) M-AVR	Example of issues that could be relevant for the strategic analysis
The ships' engines and fuel types used as well as the number of voyages carried out during the reporting period	The information about the ship and the number of voyages gives the verifier a general indication of the verification effort that is likely to be required: ● The number of different fuels in the MP give an indication on the complexity of emissions calculation; ● Technical data of the ship including the ships engines are needed to corroborate emissions and efficiency data; ● List of voyages during the reporting period has an impact on the effort for verifying per-voyage data, to verify attribution of emissions to voyages (for EU ETS reporting and applicable exemptions) ● Data gaps in the list of voyages, as well as methods used to close them.
Monitoring plan, its status of assessment by a verifier and/or approval by the AA	Understanding the MP gives an indication of the complexity of both the ship and the accounting process and hence the type and size of verification tasks necessary to complete the verification. Important aspects include: ● Date of the most recent approval of the MP by the responsible AA, and (if available) possible reports, findings, or conclusions from the controls and inspections performed by the AA, when applicable[58]; ● Procedures used to monitor and compile the list of voyages, and to attribute them to EU ETS activities, if relevant;

[57] This could for instance include relevant reports, findings, or conclusions from the controls and inspections performed in previous reporting periods by the Administering Authority, when applicable, or supporting documents on the identity of the ship and of the company (including a copy of the mandate from the registered owner, when applicable).

[58] The verifier should in particular consider whether the AA has raised any non-conformity which prevented the MP from being approved.

Element in article 11(3) M-AVR	Example of issues that could be relevant for the strategic analysis
	• Procedures used to monitor the fuel consumption; • Whether non-default emission factors are used; • The use of alternative fuels (biofuels, RFNBO/RCFs[59]) needs checking of proofs of sustainability; • The type and frequency of calibrations and maintenance of the measurement system, and their fitness for purpose • Procedures used for determining the activity data per voyage.
Data flow activities and the control system	• The path the data follows from the primary source to the final emissions report; • The data management system and its functions; • The type of quality controls implemented to reduce the risks for errors in the data; • The type and quality of the controls on the recording and transmitting of data into IT systems.

If the verifier has carried out verifications for the same ship in prior years, the information from those earlier verification(s) must be considered by the verifier. Major deviations compared to previous verifications should attract particular attention from the verifier. Although the strategic analysis will take less time in a situation where the verifier is already familiar with the ship, this does not exonerate the verifier from carrying out that analysis for the present verification engagement.

As part of the strategic analysis the verifier shall check:

- whether the MP presented is the most recent, has been previously approved by the AA (if applicable) and is in accordance with the requirements of Article 6 of the MRV Maritime Regulation;
- whether changes have occurred to the MP and whether these changes have been assessed positively by a verifier and, if applicable, approved by the AA.

During these checks the verifier assesses whether the MP is up to date and complete. If the MP is not approved or if significant changes to the MP have not been approved by the AA, the verifier directs the shipping company to the AA to rectify the situation. In principle the verifier should put the verification on hold until such approval has been obtained.

However, in some cases the verifier may continue to carry out the verification activities so long as the shipping company is fully aware that some activities may need to be repeated based on the final response of the AA and also that the response could impact the opinion of the verifier as the verification progresses. Following approval by the AA, the verifier continues, repeats or adapts the verification activities, as relevant.

4.2.4 Risk analysis

The verifier must assess the risks of misstatements and non-conformities and their material effect on the reported data. The outcome of the risk analysis determines how and to what extent the verification activities should be designed, planned and implemented. The risk analysis centres on identifying, as-

[59] Renewable Fuels of Non-Biological Origin (RFNBOs) or Recycled Carbon Fuels (RCFs) as defined by the RED II (Renewable Energies Directive, Directive (EU) 2018/2001)

sessing and quantifying two types of risks, i.e. inherent risks and control risks. Together with the detection risk, these risks form the overall verification risk, i.e. the risk that the verifier issues an inappropriate verification statement[60]. More information is provided in key guidance note on risk analysis (KGN II.2).

The risk analysis is an iterative process and must be changed if the detailed verification in the process analysis shows that the risks are higher or lower than initially assessed. In that case the verification plan also needs to be updated.

As part of this risk analysis, the verifier should identify potential risks related to the monitoring and reporting process, the different calculation steps and should take into consideration any effective risk control methods applied by the shipping company in regards to these risks.

Potential sources of **inherent risk** to be assessed by the verifier:

- Complexity and number of emissions sources and fuels used;
- Significant manual transfers and input of data concerning fuel consumption, etc., such as e.g. manual transfer from paper-written logs to spreadsheets, from spreadsheets to IT systems, from IT systems to reporting templates;
- Complex data management systems for collecting data and quantifying emissions (e.g. multiple spread sheets related/ linked to each other) or changes in data management;
- Inconsistent or complex monitoring methodologies and reporting policies, e.g. incorrect use of emissions factors, incorrect identification of voyages in scope, incorrect use of selected fuel consumption monitoring method;
- Unit conversions when consolidating information, e.g. volume to mass;
- Measuring equipment failure;
- IT system failure.

Examples of potential sources of **control risk**:

- Automated controls in the IT system that are missing or not functioning properly;
- Internal audits that have not been correctly performed;
- No monitoring / maintenance of measuring equipment as required by its producer;
- Missing separation of data input from data checking (i.e. the checking is done by one person which means there is no proper segregation of duties);
- Internal data reviews and the checking of the manual transfers of data that are not carried out, or not carried out to the rigour required in view of the inherent risk level;
- The person responsible for the control activities is not or not sufficiently knowledgeable regarding the task concerned.

---

[60] Usually, the verification risk is considered to be:

Verification Risk (VR) = Inherent risk (IR) x Control risk (CR) x Detection Risk (DR)

Where the M-AVR, Article 2, defines:

'inherent risk' means the susceptibility of a parameter in the emissions report, the partial emissions report or the report at company level to misstatements that could be material, individually or taken together, before taking into consideration the effect of any related control activities;

'control risk' means the susceptibility of a parameter in the emissions report, the partial emissions report or the report at company level to misstatements that could be material, individually or when taken together with other misstatements, and will not be prevented or detected and corrected on a timely basis by the control system;

'detection risk' means the risk of a verifier not detecting a material misstatement;

'verification risk' means the risk (a function of inherent, control and detection risk) of the verifier expressing an inappropriate verification opinion when the emissions report, the partial emissions report or the report at company level is not free of material misstatements.

The risk analysis must encompass all data sets under verification, such as:

- Voyage data;
- Fuel consumption;
- Fuel types used;
- Greenhouse gas emissions;
- Distance travelled;
- Time spent at sea;
- Cargo carried;
- Differences in data sets to be reported under MRV Maritime Regulation and EU ETS[61], in particular:
  - Different scope of GHGs covered;
  - Zero-rating of relevant fuels, as applicable, e.g. biofuels;
  - 50% / 100% coverage of voyages outside / within EEA;
  - CO_2 capture;
  - Specific route exemptions;
  - Rebate for ice-class ships.
- Aggregation of data in the emissions report or partial emissions report.

When identifying and analysing these issues the verifier needs to consider the findings of the strategic analysis and the existence, completeness, accuracy, consistency, transparency and relevance of the information reported.

4.2.5 Verification plan

The strategic and risk analysis determine how the verifier sets up the verification plan which consists of three elements (Article 13 of the M-AVR):

- The verification programme[62] which must describe the nature and scope of the verification activities as well as the time and manner in which these activities are to be carried out. It also needs to include planning all activities.
- A test plan which has to set out the scope and methods of testing the control activities and procedures for control activities;
- A data sampling plan which sets out the scope and methods of data sampling related to data points underlying the aggregated GHG emissions, fuel consumption and other relevant information[63].

4.2.6 Process analysis

The actual verification tasks, i.e. the verification process concerning the emissions report and partial emissions report carrying out the verification plan, is usually termed “process analysis”. It consists of two main parts:

- The testing of the control system’s implementation and effectiveness, including relevant procedures; and
- Testing of the actual data, usually involving a sampling approach based on the risk analysis carried out before (see section 4.2.7).

---

[61] See Maritime Guidance Document No. 1, section 5.2.

[62] The verification programme is not just an agenda for the desk research and site visit but should provide sufficient detail of planned tests and activities to inform the team members what activities should be carried out.

[63] Further guidance on data sampling is provided in Annex VI (section 8.6).

The objective of this part of the verification process is to verify whether the monitoring and reporting systems as described in the MP exist in practice and are properly implemented.

As part of the process analysis, the verifier must check at least the following (Article 14 of the M-AVR):

- the data flow activities and systems used for them, including IT systems;
- whether the control activities are appropriately documented, implemented, maintained and effective to mitigate the inherent risks;
- whether the procedures listed in the monitoring plan are effective to mitigate the inherent risks and control risks and whether the procedures are implemented, sufficiently documented and properly maintained.

To accomplish their objective the verifier needs to consider methods such as enquiry with relevant staff, document inspection, and observation and walkthrough procedures. The latter means that the verifier tracks the data flow from primary data to the compilation of the emissions report or partial emissions report.

Examples of relevant staff to engage with are: Fleet operations manager; Technical manager; Environmental manager; Fuel manager; Quality manager; IT manager; Finance manager; Chief engineer.

Examples of observation and walkthrough procedures are:

- Observation of IT systems such as:
  - Fuel management system (on-board and ashore);
  - Cargo management system;
  - Voyage planning, monitoring and management system;
  - Planned Maintenance System;
  - EU MRV software/solution, if applicable.
- Data collection on-board:
- Data entry in fleet / voyage monitoring system;
- Preparation of report;
- Control activities on the data.

4.2.7 Verification of reported data

In addition to the emissions report and partial emissions report itself, the data they contain must undergo numerous checks during the verification process. Article 15(1) of the M-AVR details the activities that the verifier shall perform to carry out data verification:

(a) detailed testing, including by tracing the data back to the primary data source;

(b) cross-checking the data with external data sources, including ship-tracking data;

(c) performing reconciliations;

(d) checking thresholds as regards appropriate data;

(e) carrying out recalculations.

Article 15(2) of the M-AVR further specifies some key elements of the reported data that require the attention of the verifier. Article 15(2) sets minimum standards which do not prevent the verifier from considering, as appropriate and notably depending on the risk analysis, any additional elements in the reported data which may impact emissions levels. Table 2 lists these elements and provides examples for the verifier's activities in data verification.

Table 2: Elements to be verified in reported data

Element in article 15(2) M-AVR	Examples of activities to be performed by the verifier
Completeness of emission sources	• Check that all emissions sources listed in the MP have been considered in the fuel consumption calculation; • Verify the effective implementation of the relevant procedure as described in the MP.
Completeness of data, including those on voyages reported as falling under the MRV Maritime Regulation	• Verify the effective implementation of the relevant procedures as described in the MP • Perform testing based on the sampling plan (reconciliation, recalculations, and document cross-check, for example with ship's logbook and/or Arrival/Noon/Departure reports where applicable) • Check fuel consumption at sea and at port, time at sea, distance sailed and transport work based on raw data provided all reportable voyages • Check logical sequence of consecutive voyages • Check that ports of call are for loading or unloading commercial cargo, or embarking or disembarking passengers • Check correctness of reported voyages are under geographical scope of the regulation.
Completeness and consistency of data related to emissions falling within the scope of the EU ETS Directive	• Verify the effective implementation of the relevant procedures as described in the MP • Check fuel consumption at sea and at port, time at sea, distance sailed and transport work based on raw data provided all reportable voyages • Perform substantive testing based on a sampling plan (reconciliation, recalculations, document cross-check); • Focus on correct application of the data for applying relevant calculation steps for data differing from the emissions under MRV scope (geographical scope, phase-in percentages for 2024 and 2025-related emissions data, derogations for outermost regions, ice-class vessels, certain islands and transnational routes under public service obligation, zero-rated fuels, etc.[64])
Consistency between reported aggregated data and data from relevant documentation or primary sources	• Perform walk-through tests on a sample of data points; • Corroborate data and calculations using fall-back data sources indicated in the MP.
If applicable, the consistency between aggregated fuel consumption and data on fuel purchased or otherwise supplied to the ship in question	A possible procedure for such tests can be described as follows: • Select a time period (in accordance with the sampling plan) • Request of the reported fuel consumption for the selected period • Review all documentation (i.e. BDNs[65]) for the selected period. • Request stock takes values (ROB[66]) for the first and the last date of the selected period. • Cross check BDNs with fuel consumption • If difference between aggregated fuel consumption and supplied fuel exceeds a threshold[67] set by the verifier for this test procedure in the aggregated values, proceed with further investigation

[64] See short list of exemptions in section 4.2.4 and more details in Maritime Guidance Document No. 1, section 5.2.

[65] Bunker Delivery Note

[66] Rest On Board

[67] To be based on the verifier's expert judgement, including materiality considerations.

Element in article 15(2) M-AVR	Examples of activities to be performed by the verifier
Reliability and accuracy of the data	In accordance with the verification plan, select a sample of voyages and perform substantive testing. Perform relevant plausibility checks on the data to get a sense on accuracy and completeness of data: • Plausibility checks with average fuel consumption per voyage / day / hour / distance; • Plausibility checks of passenger data with the maximum number of passengers allowed (from the vessel's "Permit for carriage of passengers"); • Plausibility checks of cargo data with deadweight design or maximum cargo carried; • Plausibility checks of fuel in tanks, bunker uptakes and fuel consumption data with maximum tanks' capacities; • Check distances against distance on the shortest route using online distance calculator; • Check time at sea based on departure and arrival times; • Etc.

4.2.8 Treatment of data gaps

If methods laid down in the MP have been used to close data gaps pursuant to Section 2 of Part C of Annex I to the MRV Maritime Regulation, the verifier has to verify whether these methods were appropriate[68] and applied correctly. Furthermore, if these methods were not assessed or approved beforehand (in case the method used was not included in the MP before), the verifier has to verify that the approach to complete the missing data ensures that the emissions are not underestimated and does not lead to material misstatements.

Where, for technical reasons, it is temporarily not feasible to apply the monitoring plan satisfactorily, the company shall apply a conservative method based on alternative data sources listed in the monitoring plan for the purpose of performing corroborative checks, or, if such an alternative is not contained in the monitoring plan, an alternative method which provides surrogate data or a conservative estimation, until the conditions for application of the approved monitoring plan have been restored.

Data gaps are a form of misstatements. As is discussed in section 4.4, the shipping company must address all misstatements identified by the verifier before the verification statement can be issued. The data gap must therefore be closed by the shipping company using surrogate data, even if the data gap itself is smaller than the materiality threshold.

Special case 1: Determining emissions data for the period **before the shipping company has established its monitoring plan** when it falls under the MRV Maritime Regulation for the first time (i.e. after its first port call in a port falling under a Member State's jurisdiction). Experience of the first years of the MRV Maritime Regulation's implementation show that shipping companies usually monitor and store data on the vessel's emissions and energy efficiency (e.g. on fuel consumption, distance travelled, cargo carried, time spent at sea, etc.) as these are monitored within the general management system of the ship, i.e. beyond the purposes of the MRV Maritime Regulation. However, the data available may not be in line with the specific requirements set in that Regulation and it will require companies to rework/systematise the data available for EU voyages, transport work, etc.

The general rule would be that the shipping company should use their best available data (e.g. BDNs for fuel consumption), and any methods that comply with international standards or sound scientific

[68] See guidance on MP Table D.1 as provided in section 7.4.4 of Maritime Guidance Document No. 1.

principles. Where companies do not have sufficient data available, they will need to provide acceptable default factors for data gaps. As there is no one-size-fits-all solution, each company will provide its own estimation method for data gaps. Estimation methods may include ship's own values from past voyages, extrapolation, interpolation, sector information, tracking data bases, etc.

Special case 2 – Missing partial ER: In case the previous shipping company does not provide the verified ER in time for the new shipping company to compile the whole year's emission report, a data gap comparable to the one under special case 1 appears, i.e. the necessary data may probably be compiled based on existing ship's data, but it is not guaranteed that data is in conformity with the MP's needs, once the MP is assessed by the verifier, and approved by the AA, if relevant. However, if the data gap is closed with best available data, the verifier should be able to conclude positively on the ER, unless the new shipping company has intentionally failed to contributing best available data, e.g. by delaying the request for the partial ER to the previous company.

It is the duty of the shipping company taking responsibility for the ship to ensure that all necessary documentation and, where necessary, information to fill possible data gaps is obtained during the change of shipping company. Experience underlines that it is best practice to include the exchange of relevant documentation and information as a contractual requirement for the shipping company change.

Example

- Estimation of fuel oil consumption

The use of the engine power speed curves can yield a power-speed histogram. It is preferred to have the day split into more than one segment. The specific fuel oil consumption can then be estimated from the engine manufacturer's curves. This exercise will define the propulsion-related fuel consumption. It can also be found in the Engine Room Log Book. Many ships integrate torque meters and RPM meters and provide digital image of power. Power will change with weather/speed. Once again, the E/R Log Book will contain the power (and SFOC[69]) of the diesel generators. Please note that the power at sea for diesel generators is but a fraction of the propulsion power. Boilers are typically operated at sea without additional fuel consumption, with economizers in use.

- Estimation of fuel consumption

An alternative path to estimate fuel consumption looks at fuel consumption of other similar vessels or looks at similar conditions of speed and weather, as evidenced from the noon reports and log book. If distance changes, consumption can be scaled proportionally to the distance.

- Estimation of transport work data

Cargo can be estimated from the drafts in the log book. Distance travelled can be obtained from the GPS or the log book/noon reports.

4.2.9 Site visits

Article 18 of the M-AVR requires the verifier to carry out site visits to the shipping company at one or more appropriate times during the verification process of the ships' emission report or partial emissions report. The verifier has to determine locations for its site visit based on the results of the risk analysis and considering where the critical mass of relevant data is stored and where data-flow and control activities are carried out. If the verifier concludes that on-board verification is needed to reach a reasonable level of assurance and to sufficiently reduce the risk of undetected material misstatements in the emissions report or partial emissions report, the verifier may also decide to visit the ship.

As an alternative to physical, in person, site visits, so-called virtual site visits may be considered provided that conditions are fulfilled (see more details below). Only under special conditions, the verifier may

[69] Specific Fuel Oil Consumption

waive the site visit completely, irrespective of the mode (i.e. physical and virtual) – see also more details on the conditions below.

A virtual site visit is in principle a video conference accompanied by any further written/electronic communication. For that purpose the verifier will request the shipping company to provide all necessary information electronically. For specific issues such as checking the actually used measuring instrument and its reading, it may be necessary that some staff of the shipping company visits relevant parts of the ships on request of the verifier during the video conference and thereby provides video evidence to the verifier. If during the virtual site visit the verifier does not obtain all necessary evidence for positively concluding on the emissions report, the verifier has to consider to carry out a physical site visit.

Conditions for a virtual site visit

For choosing to perform a virtual site visit instead of a physical visit, one of the following conditions must be fulfilled and documented by the verifier in its internal verification documentation:

(a) the verifier has sufficient understanding of the ship's monitoring and reporting systems, including their existence, implementation and effective operation by the company;

(b) the nature and level of complexity of the ship's monitoring and reporting system are such that a physical site visit is not required;

(c) the verifier is able to obtain and assess remotely all requisite information, including correct application of the methodology described in the monitoring plan and verification of the data reported in the emissions report or partial emissions report;

(d) where serious, extraordinary and unforeseeable circumstances, outside the control of the company, prevent the verifier from carrying out a physical site visit and where those circumstances cannot, after using all reasonable efforts, be overcome[70].

The verifier shall not carry out a virtual site visit if no physical site visit has been carried out in the three reporting periods immediately preceding the current reporting period[71]. This means in practice that a physical site visit shall take place at least once over a period of four consecutive years, irrespective of whether verification in previous years was carried out by the same verifier or a different one, and except if circumstances under point (d) apply. Carrying out a virtual site visit is not considered as a waiving of site visit.

Conditions for waiving the site visit

The verifier may waive the site visit if conditions (a) to (c) above are fulfilled cumulatively. However, this is not allowed if the verifier assesses the emissions report or partial emissions report of the ship for the first time, or if no site visit (either physical or virtual) has been carried out during the preceding two reporting periods. Furthermore, for ships carrying out activities falling under the EU ETS, the verifier must inform the administering authority of its intention to waive the site visit. The AA may object to the waiving of a site visit. The AA has to take into consideration the following:

- The information provided by the verifier regarding the results of the risk analysis;
- Information that all relevant information can be obtained and assessed remotely;

[70] For example the Covid-19 Pandemic was such a case of force majeure.

[71] When considering the three reporting periods immediately preceding the current reporting period, the verifier should also include reporting period(s) during which a virtual site visit was held because of serious, extraordinary and unforeseeable circumstances as referenced to in Article 18(6), point d.

- Evidence that all conditions for waiving the site visit (i.e. (a) to (c) above, and the required earlier site visits) are met.

In the case of a site visit being carried out virtually or being waived, the verifier has to inform the shipping company and, where relevant, the AA of this decision immediately and has to take measures to reduce the verification risk to an acceptable level. The verifier should obtain reasonable assurance that the emissions report or partial emissions report is in conformity with the MRV Maritime Regulation.

The justification for the decision for any virtual or waived site visit has to be recorded in the internal verification documentation.

4.2.10 Addressing misstatements, non-conformities and the materiality level during verification

As a next step during the verification process, the verifier has to address any misstatements and non-conformities in the emissions report or partial emissions report, by informing the shipping company and requiring action. The shipping company has to make all necessary corrections to the emissions report or partial emissions report in all points identified by the verifier. Thereafter, the verifier has to decide whether any remaining issues have a material effect on the data provided or not. More guidance on misstatements, non-conformities and their materiality is given in chapter 4.4.

4.2.11 Concluding on the findings of the verification of the emissions report and partial emissions report

When completing the verification and considering all evidence gathered during the verification, the verifier is required to carry out the activities listed in Article 20 of the M-AVR. This includes:

- Confirming that all (planned and relevant) verification activities have been carried out;
- Performing final procedures to ensure the aggregated data is free of material misstatements;
- Verifying whether the information in the report satisfies the requirements of the MRV Maritime Regulation and, where applicable, of the EU ETS Directive;
- Submitting the internal verification documentation and the draft report to the independent reviewer, before issuing the verification report;
- Authorising a person to authenticate the report and the evidence of the internal verification documentation, and notify the shipping company thereof.

A key aspect of this step is that the verifier has to ensure that it has gathered sufficient evidence to support the verification statement.

Sufficiency of evidence is influenced by the risk of the shipping company's report being materially misstated: The greater the risk of a material misstatement, the more detailed verification activities and the more evidence are likely to be required. In addition, the quality of the evidence also plays a role (the better the quality of the evidence, the less important the quantity of the evidence is likely to become). However, merely obtaining more evidence may not always compensate for its poor quality.

The reliability of evidence is influenced by its source and by its nature and is dependent on the individual circumstances under which it is obtained. For example:

- If evidence is obtained from external, independent and knowledgeable sources (e.g. external lab analysis), it could be more reliable than internal sources in the shipping company.
- Evidence that is generated internally is more reliable when the related control activities are effective or if the verification team has directly obtained the evidence (e.g. observing how the shipping company has carried out a manual cross check on the data instead of inquiring whether the shipping company has carried out such a control).

The verifier generally obtains more assurance from consistent evidence obtained from different sources or from evidence of a different nature than from items of evidence considered individually. When evidence obtained from one source is inconsistent with that obtained from another, the verifier will determine what additional verification activities mentioned under the process analysis are necessary to resolve the inconsistency.

4.2.12 Recommendations for improvement

When compiling the verification report, the verifier should not only report misstatements and non-conformities (whether material or not), but may also include "recommendations for improvement" as laid down in Article 21 of the M-AVR. For any uncorrected misstatements and non-conformities not leading to material misstatements, such reporting is mandatory, but the verifier may include also other recommendations for improvement for issues that it finds relevant. The shipping company should address those recommendations, unless the improvement would be considered as small or as causing unreasonable costs etc. These recommendations have to be taken into account by the verifier during the verification in the following year and their implementation has to be verified. If the shipping company has not implemented them, the verifier must assess whether this fact increases or may increase the risk of misstatements. For shipping companies, it is best practice to document any reasons for or against implementing the recommendations, in order to facilitate next year's verification.

During the process of recommending improvements, it is important that the verifier remains impartial towards and independent from the shipping company and doesn't give advice or develops parts of the monitoring and reporting process.

4.2.13 Internal verification documentation

The verifier must compile the internal verification documentation to provide a complete trail of evaluations and decisions that enabled the verifier to reach its verification opinion with reasonable assurance. In accordance with the definition of "verification", the verifier must collect evidence that supports the verification statement. This evidence is to be collected in the internal verification documentation. Annex II of this guidance document (section 8.2) contains a list of minimum elements to be included in the internal verification documentation.

The internal verification documentation needs to be transparent and must be drafted in such a manner that the independent reviewer and the national accreditation body (NAB)[72] can assess whether the verification has been performed in line with the M-AVR. They have to be able to follow the complete document and data trail and assess the critical decisions and issues that occurred during the verification process.

In addition to this, the AA may request that the verifier provides access to its internal verification documentation and any other relevant information. However, this is not a requirement for the AA. The main responsibility for checking the internal verification documentation lies with the NAB.

4.2.14 Independent review of the emissions report and partial emissions report

Just like the assessment of the MP in Chapter 4.1.5, the verification of an emissions report or partial emissions report must undergo an independent review. This happens at the time the verification report

[72] Assessment of the verifier's internal verification documentation is part of the NAB's assessment of the verifier's competence and procedures during the accreditation and surveillance process.

and internal verification documentation on the specific verification have been drawn up, but before the verification report is signed and issued to the shipping company.

The objective of this review is to provide:

- A quality review function and to look for technical errors or omissions;
- A final check that due professional care and judgement has been applied in the verification process, e.g. that the scope of work is consistent with the ship's activities and achieving a reasonable level of assurance;
- A final check to confirm that the verification team has carried out the verification in line with the M-AVR and that the procedures for the verification activities have been correctly applied;
- An assessment of whether the evidence gathered is sufficient to support the opinion stated in the verification report;
- A proof reading function, e.g. to correct simple errors, typographical mistakes and omissions.

If an independent reviewer has identified errors or concludes that insufficient evidence has been gathered, the Lead Auditor needs to correct these and obtain the missing evidence or corroboration. Changes that the verifier makes in the verification report as a result of the independent review must be reviewed by the independent reviewer, along with the underlying evidence. Independent review covers all the steps in the verification process and focuses in particular on the following elements:

- The selection of the verification team (e.g. a check on whether the verification team holds the required competences);
- How the verifier has evaluated its risks to undertake this particular verification engagement (e.g. what time was allocated for the verification, what conditions were incorporated in the contract with the operator);
- Strategic analysis, risk analysis and verification plan, including revisions of the risk analysis and the plan;
- The activities performed during the process analysis, the evidence gathered, as well as the changes in the planned and executed verification activities;
- How the verification team has completed the internal verification documentation, and the consistency between the internal verification documentation and the verification report;
- Any issues raised by the verifier, in particular those that are related to the verification statement;
- Misstatements, and non-conformities communicated to the shipping company, whether these have been addressed by the shipping company and how these have been reported in the internal verification documentation;
- Review of any uncorrected misstatements and non-conformities; and of how the verifier has determined the material impact of these on the reported data;
- The justification for the opinion in the verification report.

An important requirement is that the independent reviewer must not have carried out verification activities that are subject to his review. This means that the independent reviewer shall not be part of the verification team or be involved in any of the verification activities for that particular ship.

The results of the review have to be included in the internal verification documentation and the verifier needs to notify[73] the Commission and the ship's flag state of whether the conditions for issuing the document of compliance are fulfilled.

[73] Through the issuance in THETIS-MRV of a valid digital version of the Document of Compliance in accordance with the template provided in Annex III to Commission Implementing Regulation (EU) 2023/2449. The issuance of the Document of Compliance is only possible after the verifier has marked the emissions report as 'verified as satisfactory' in the system.

4.2.15 Verification report and Document of Compliance

The verifier shall issue to the shipping company, for onwards reporting to the AA, a verification report related to each ship's report it has verified. Article 22 of the M-AVR contains requirements on the content of the verification report.

Two types of verification statements are possible (verified as satisfactory and verified as unsatisfactory), with various justifications. Each of those statements and justifications have their own impact and characteristics, as explained in Table 3.

Table 3: Characteristics of verification statements

Verification statement[74]	Clarification
The report is free from material misstatement and thus verified as satisfactory	A report is verified as satisfactory if: ● The report contains no misstatements or non-conformities. The verification statement is of the type "verified without comments". ● The report contains issues that have no material impact on the reported data. These are issues that are not resolved at the time of reporting and may include: ● non-material misstatements; ● non-conformities that have no material effect on the reported data; ● recommendations for improvements; If such issues are reported, the verifier should select the statement "verified with comments". These comments have to be addressed (see section 4.2.16 after the report is issued).
The report contains material misstatements that were not corrected before issuing the verification report The CER is verified as unsatisfactory	The verifier issues a negative verification statement. The outstanding material misstatements or non-conformities which cause material misstatements should be listed in the verification report. See section 4.2.16 for treatment of outstanding issues and 4.4 regarding the decision on materiality of misstatements and non-conformities.
Scope of verification is too limited The CER is verified as unsatisfactory	A limitation of scope of verification may arise from the following situations: ● Data is missing that prevents a verifier from obtaining the evidence required to reduce the verification risk to the level needed to obtain reasonable level of assurance, e.g. some or all primary source data are missing and data are only available at an aggregated level; ● The MP (in its current version) has not been assessed as satisfactory by an accredited verifier or, where applicable, not approved by the AA. Thus it is not providing a proper reference document for the verifier to check the report against;[75] ● The MP does not provide sufficient scope or clarity to conclude on the verification, e.g. parts of the monitoring methodology are not properly described in the MP;

[74] The AVR for installations and aircraft operators explicitly lists these types of verification statements in Article 27. They apply also for ships and company level emission reports, as they are based on common practice and international standards such as ISO 14064-3.

[75] For avoiding this situation, two good practices are to be mentioned: (a) In such situation the shipping company must act immediately and seek approval by the AA, so that the verifier can continue its work. (b) For enabling point (a), it is important that verifiers are contracted early during the reporting period, and that verifiers start their verification well before the deadline for submission of the emission report, so that there is sufficient buffer time, taking into account that both verifiers and AAs face peak workloads in the months running up to the submission deadline.

Verification statement[74]	Clarification
	• The shipping company has failed to make sufficient information available to enable the verifier to carry out the verification: e.g. the shipping company has not provided the verifier with all information required (see section 4.2.2).
Non-conformities individually or combined with other non-conformities provide insufficient clarity and prevent the verifier from stating with reasonable assurance that the report is free from material misstatements. The CER is verified as unsatisfactory	Usually when non-conformities are found during the verification process, such findings affect the risk analysis and the planned verification activities. In particular, if these non-conformities increase the risk of misstatements and create uncertainty over the accuracy of the data, the verification activities must be more detailed and further tests and checks will be required to achieve more assurance and confidence in the data. If for example inadequate control activities have been implemented (e.g. no calibration, no procedures ensuring completeness of the fuel, no proper IT interface that is used to aggregate the data), the verifier will undertake more substantive testing to assess the accuracy of the data. However further testing will not always provide the verifier with sufficient confidence in the data. In some cases these non-conformities (individually or combined with other non-conformities) provide too much uncertainty for the verifier to positively state with reasonable assurance that the shipping company's report is free from material misstatements. This could for example happen if the shipping company does not calibrate the measurement equipment, the non-conformity is repeatedly not corrected and calibrated measurement results are not present, thereby causing the verifier to be uncertain whether the reported data is free from material misstatements.

Document of compliance

Verification is not only the confirmation of a single number (the total emissions in the reporting period), but includes the confirmation of the ship's compliance with the MRV Maritime Regulation. For the purpose of the MRV Maritime Regulation, a specific documentary evidence, the Document of Compliance (DoC) is established as a proof of compliance for the shipping company with regard to its obligations under MRV in respect of a specific ship. The DoC is valid for the period of 18 months after the end of the reporting period, i.e. sufficiently long until the next verification is due, and needs to be carried onboard the ship for Port State Control checks. It is a responsibility of the verifier to issue such DoC through THETIS-MRV in accordance with Article 17 of the MRV Maritime Regulation, but only if the emissions report for the relevant ship has been verified satisfactorily. No DoC is foreseen in relation to partial ERs nor to CER.

4.2.16 Addressing outstanding issues in the verification report

Outstanding misstatements and non-conformities with the MRV Maritime Regulation and recommendations for improvement that have been listed in the verification report have to be addressed by the shipping company. The different issues and the relevant follow-up are described in Table 4.

Table 4: How to address different outstanding issues

Type of outstanding issues	How to address
The verification report contains no misstatements or non-conformities or recommendations of improvement	No action required by the shipping company

Type of outstanding issues	How to address
The verification report contains non-material misstatements	As the ship's emission report or partial emissions report serves as input to a company-level emissions report, the AA may assess the ship's emission report, and may assess those misstatements and make a conservative estimate of the emissions in the CER if it considers that such an estimation is necessary – in particular in case the AA considers the misstatement to be material. The AA shall inform the shipping company whether and which corrections are required to the shipping company's report. The shipping company shall make that information available to the verifier. If the ship does not fall within the EU ETS scope (but only within MRV scope), it remains between the shipping company and the verifier to resolve the issue. For example, the verifier should take it into account for verification in the following year, e.g. by increasing the verification risk accordingly. Usually non-material misstatements will furthermore lead to recommendations for improvement.
The verification report contains non-conformities regarding the MP[76] that do not lead to a non-satisfactory report	The shipping company should update the ship's MP and submit it to the verifier for assessment and thereafter to the AA. The verifier shall assess during the next verification year whether these non-conformities have been corrected. If these have not been corrected, the verifier must consider whether this increases or may increase the risk of misstatements. This in turn will affect the planning of the verification and the detail of the verification activities (e.g. further testing). During the verification process the verifier will instruct the shipping company to correct these non-conformities. If the shipping company still does not correct the non-conformities, this will be one of the factors to take into account when assessing the materiality of misstatements and non-conformities found during the verification. Continued non-correction may lead to minor issues being escalated to material issues in subsequent verification cycles.
The verification report contains non-conformities with legal requirements	If the non-conformity has led to a non-material misstatement, the AA shall evaluate the misstatement, see case above (non-material misstatements). The non-conformity itself has to be corrected in the MP, where necessary in consultation with the AA. The verifier shall assess during the next verification whether these non-conformities in the MP have been corrected. If not, this may lead to additional risks that the verifier has to take into account. It may furthermore affect the verifier's judgement on the materiality of this non-conformity.
The verification report states that the ship's report cannot be verified as satisfactory	• If applicable, the AA shall make a conservative estimation of the emission data for the purpose of the company-level emissions report, inform the shipping company thereof, and enter the estimated data in the registry according to Article 31(6) and (7) of the Registry Regulation[77]. • The verifier shall not issue a Document of Compliance.
The verification report includes recommendations for improvement	Recommendations for improvement can cover a whole range of topics. It not only includes suggested improvements to the shipping company's risk assessment, data flow, control activities and procedures but it could also involve recommendations concerning monitoring and reporting emissions such as using better measuring instruments. In the following verification year, the verifier shall check whether the shipping company has implemented those recommendations for improvement and the manner in which this has been done. If those recommendations have not been implemented the verifier must consider whether this increases or may increase the risk of misstatements and non-conformities. This in turn will affect the planning of the verification and the detail of the verification activities (e.g. further/more detailed testing).

[76] See definition in section 4.4.1

[77] Commission Delegated Regulation (EU) 2019/1122 of 12 March 2019 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards the functioning of the Union Registry. Consolidated Version: http://data.europa.eu/eli/reg_del/2019/1122/2025-01-01

4.3 Verification of reports at shipping company level

In addition to the emissions reports and partial emissions reports at the level of the individual ships as discussed in the previous chapter, Article 11a of the MRV Maritime Regulation mandates that, starting in 2025, shipping companies must submit a verified emissions report at the company level. This Company-level Emissions Report ("CER") has to include the aggregated emissions data to be reported under the EU ETS Directive during the reporting period, based on the data of the emissions reports and partial emissions reports already verified.

Before or at the latest on 31 March each year, the shipping company has to submit the verified report together with its corresponding verification report to the AA and the flag States concerned. In order for this deadline to be met, it is important for shipping companies to start the process of reporting and for the verifier to start the verification early to have sufficient time to resolve any issues found during verification before the deadline. Where the same verifier verifies the ship-level emissions reports (ERs) as well as the CERs, there is the possibility to carry out both tasks in parallel for efficiency reasons, provided that any misstatements found in one report and subsequently corrected are also consistently corrected in the other report and that any appropriate follow-up action is taken.

Please note that the overall process of verification (see section 4.2 and Figure 3) is very similar for company-level emission reports as for ship's reports. Therefore, this section focusses on the elements that are specific to the CER verification. For general guidance on the verification process, you can therefore refer to section 4.2.

4.3.1 Information provided by the shipping company

Like for the assessment of the MP (section 4.1.1) and for the verification of the (partial) emissions report at ship level (section 4.2.2), the shipping company is required to provide specific information to the verifier at the pre-contract stage. In particular this includes (Article 24 M-AVR):

1. The report at shipping company level for the reporting period (i.e. the CER);
2. The emissions reports and partial emissions reports together with their respective verification reports for all ships under the shipping company's responsibility during the reporting period.
3. If the verification of the emission report at shipping company level in the previous year (i.e. CER of previous year) was not carried out by the same verifier, copies of the following documents have to be provided:
   - the emissions report at shipping company level and the related verification report for the previous year;
   - the emissions reports and partial emissions reports of all ships under the shipping company's responsibility during the previous year;
   - the corresponding verification reports to the aforementioned documents.
4. A list of all shipping company's ships of 5 000 gross tonnage and above during the reporting period. This list must also include the ships' IMO ship identification number as well as the period the ship was under the shipping company's ownership or responsibility.

Additionally, verifiers may ask the shipping company to provide any other information relevant to the verification of the CER.

Missing (verified) emissions reports or partial emissions reports

During verification of company-level emission reports, it may occur that some ships' emissions reports or partial emissions reports are missing or have not been verified yet, leading to potential data gaps in the emissions report at company level. The verifier has to take this situation into account on a case-by-case basis: If the emissions report is not verified yet, the verifier may request from the shipping company to get the preliminary (unverified) report in order to decide if the missing report would establish a material misstatement. If the shipping company has not yet contracted a verifier for that ship's ER, the verifier of the CER may consider taking on this task itself (provided the activities of the pre-contract stage regarding ER verification result in the verifier being able to accept this engagement – see section 4.2.1). If not even a preliminary report is available, the verifier will have to make an estimate of the ship's emissions based on its technical data and assuming it has carried out EU ETS voyages during the whole missing period (i.e. using conservative assumptions[78]). If this estimate of the data gap resulting from the missing ER results to be material for the whole CER, the verifier will not be able to provide a positive verification statement on the company-level emissions report. However, if the missing emissions report becomes available before the CER submission deadline of 31 March, the verifier can continue the verification tasks accordingly.

Where a ship came under the responsibility of the shipping company during the reporting year, the shipping company needs to receive a verified partial ER from the previous company. While a missing ER will result in a data gap of this ship's annual emission report for the purpose of the MRV Maritime Regulation (see section 4.2.8), the data in this partial ER does not establish a data gap for the CER of the new shipping company. Nevertheless the verifier of the CER should perform a check on the completeness of any partial ERs, and whether the dates given for when the ship falls under the responsibility of the shipping company are consistent with the voyage data covered by the shipping company's CER.

4.3.2 Strategic analysis

Just as is the case for the (partial) emissions report in chapter 4.2.3 the verifier has to perform a strategic analysis before starting the verification process for the CER. The objective thereof is to obtain an understanding of the activities carried out by the shipping company. As a minimum, the verifier shall take into account the information gathered under points 1 to 4 listed in section 4.3.1 from the shipping company, and the information obtained for previous years, should the verifier have carried out the verification for the same company at that time.

4.3.3 Risk analysis

Article 26 of the M-AVR requires the verifier to conduct a risk analysis similar to the one described in chapter 4.2.4 for the (partial) emissions report. This analysis should encompass the types of risks mentioned in footnote 60 (inherent, control and detection risks). It must encompass all data sets under verification, such as:

- the number of ships under the shipping company's responsibility during the reporting period;
- the number of shipping company changes for ships under the shipping company's responsibility during the reporting period;
- the diversity of ships' engines and fuel types used;

[78] This estimate may lead to a significant over-estimation. However, it is certain that the estimate is conservative. The verifier may consider e.g. looking into external tracking data to come up with a better estimate. However, this would be an additional effort, but is not in line with the principle that for CER verification the verifier should avoid duplication of the ER verification. In particular if there is a chance that the missing ER is still provided in time, it would be a waste of resources.

- the number of different flag states[79];
- the range of different verifiers having carried out verification activities[80] for the emission reports of ships under the shipping company's responsibility during the reporting period;
- the number of monitoring plans of ships under the shipping company's responsibility not approved by the AA before the verification reports for the relevant (partial) emissions reports were issued;
- the number, nature and scale of misstatements and non-conformities related to the emissions reports or partial emissions reports of ships under the shipping company's responsibility;

Just like the risk analysis of the (partial) emissions report outlined in Chapter 4.2.4, the risk analysis for the emissions report at company level is an iterative process, i.e. the risk analysis may require updating based on findings during the process analysis.

4.3.4 Data verification

This part of the verification process regarding the emissions report at company level concerns the detailed checking of the reported data. It requires checking of:

- The completeness of the report, in particular whether it includes all ships falling within the scope of the EU ETS Directive;
- The correctness of the calculations leading to the aggregated emissions data at shipping company level. The calculation must ensure that all differences between the emissions under MRV Maritime scope and EU ETS are correctly taken into account. These are[81]:
  - Different scope of GHGs covered;
  - Zero-rating of biofuels, RFNBOs, RCFs, and SLCFs[82];
  - 50% / 100% coverage of voyages outside / within EEA;
  - CO_2 capture;
  - Specific route exemptions (e.g. in respect of outermost regions, small islands, transnational routes under public service obligation or contract);
  - Rebate for ice-class ships.

It is to be noted that the majority of the information used at this stage has already been verified separately in the ships' emissions reports. Therefore, Article 15(6) of the MRV Maritime Regulation clarifies: "*The verifier shall not verify the emissions report and the report referred to in Article 11(2)* [the partial emissions report] *of each ship under the responsibility of the company.*" In other words, the verification of the CER does not require, in principle, an additional verification of the previously verified underlying ERs. However, the following considerations apply:

- If one or more of the individual ships' (partial) emissions reports contains remaining misstatements, the verifier for the CER has to assess if these – individually or aggregated – have a material impact on the company-level emissions report, and take this into consideration for the verification statement.
- If the verification of the ships' reports was done by a different verifier, the verifier of the CER must treat the results as it would treat the result of other "outsourced activities" (see section 5.4). This

[79] Flag States may each have different requirements, procedures and enforcement checks in place, leading possibly to more complex verification activities for the whole fleet in case its vessels are under different flags.

[80] While all accredited verifiers should follow the same requirements under the MRV Regulation and the M-AVR, having different verifiers for the ships under a company's MRV responsibility may bring additional complexity - and therefore risks - to the verification of a CER, e.g. due to different ways of summarising information, templates used, etc.

[81] See Maritime Guidance Document No. 1, section 5.2.

[82] Synthetic Low-Carbon Fuels as defined by Article 3(23h) of the MRR: *"'synthetic low-carbon fuels' means gaseous and liquid fuels, the energy content of which is derived from low-carbon hydrogen as defined in Article 2, point (13) of Directive (EU) 2024/1788 [Gas Market Directive], which meet the greenhouse gas emission reduction threshold of 70 % compared to the fossil fuel comparator […]"*

means that, for ensuring a reasonable level of assurance, a sampling of ships' verification reports may be required, and the selected verification reports must be checked by the verifier for the CER to understand the verification tasks already performed as well as any remarks made by the ER verifier(s).

- It may happen that the verifier for the CER may not agree with the conclusions by the verifier for the ship's report (ER) on the materiality of individual misstatements reported in the ER(s). If that is the case, the verifier for the CER should include relevant observations in the CER's verification report and those may require improvements on the side of the shipping company, or a follow-up by the AA (e.g. communicating the issue to the NABs who accredited the verifiers for potential remedies).

4.3.5 Site visits

The verifier has to carry out site visits to the shipping company at one or more appropriate times during the verification process of the CER verification (Article 31 of the M-AVR). In this case, the verifier is likely to focus on the onshore locations of the shipping company, or "*the place where the critical mass of relevant data is stored and the place where data-flow activities and control activities are carried out*". This does not exclude the possibility to carry out visits onboard ships in the context of CER verification activities.

A site visit may be carried out virtually if the verifier is able to obtain and access all relevant information remotely or if serious, extraordinary and unforeseeable circumstances, outside the control of the shipping company, prevent the verifier from carrying out a physical site visit, even after using all reasonable efforts.

Furthermore, based on the outcome of the risk analysis, the verifier may decide to waive a site visit. This is possible if all the following conditions are cumulatively fulfilled:

- The verifier is able to obtain and assess all relevant information remotely;
- It is not the first time that the verifier verifies an emissions report at shipping company level for that shipping company;
- The verification can be carried out with reasonable assurance without any such site visit.

The verifier shall inform the shipping company without undue delay of its decision carry out a virtual site visit or to waive the site visit, and include a justification for doing so in the internal verification documentation.

In case of the CER verification, the AA has the right to object to the waiving of site visits, e.g. if it finds that not all the conditions for waiving the site visit are fulfilled. Therefore, the shipping company shall inform the AA without undue delay of the decision of the verifier. The AA can object to the decision to waive a site visit taking into consideration the information provided by the verifier on the outcome of the risk analysis and the evidence that all aforementioned conditions for waiving the site visit are met. In case of objection, the AA shall inform the shipping company accordingly within a reasonable time, but no later than two months from the date it was informed of the verifier's decision to waive the site visit. Therefore, it is important for the verifier to carry out the risk analysis and strategic analysis early enough to still allow for a site visit in case the AA objects.

4.3.6 Concluding on the verification of the CER

After having carried out the activities of the verification plan (including site visits if not waived, data sampling etc.), addressing all relevant misstatements and non-conformities by the shipping company, assessing the materiality of remaining issues (see section 4.4) and compiling the findings in the internal verification documentation, the verifier completes the verification by considering all evidence gathered (Article 33 of the M-AVR) in order to conclude on the verification statement, i.e. whether the data has been found to be correct and the information in the report to fulfil the requirements of the MRV Maritime Regulation and the EU ETS Directive.

Thereafter, the verifier submits the internal verification documentation and the draft verification report to the independent reviewer, before issuing the verification report to the shipping company (after authentication of the report and the evidence of the internal verification documentation by an authorised representative of the verifier). The verification report shall contain the elements listed in Article 35(5) of the M-AVR, in particular the identification of the shipping company and the CER, the verified emissions, a verification statement, any unresolved (material or non-material) misstatements and non-conformities and recommendations for improvement.

4.4 Addressing misstatements, non-conformities and their materiality

During the assessment of the MP or the verification of the emissions report, partial emissions report or emissions report at company level, the verifier will check whether the relevant documents (MP, ER, CER) contain “misstatements” and “non-conformities”. The verifier must inform the shipping company on a timely basis if it has identified misstatements or non-conformities and request relevant corrections within a reasonable deadline. **The shipping company has a general obligation to correct any non-conformities and misstatements, irrespective of the impact[83] of the single non-conformity/misstatement.**

4.4.1 Definitions

Article 2 of the M-AVR defines:

*‘**non-conformity**’ means one of the following:*

(a) for the purpose of assessing a monitoring plan, that the plan does not fulfil requirements under Articles 6 and 7 of Regulation (EU) 2015/757, Directive 2003/87/EC and Commission Implementing Regulation (EU) [2023/2449][84];

(b) for the purpose of verifying an emissions report and a partial emissions report, one of the following:

(i) the greenhouse gas emissions and other relevant information are not reported in line with the monitoring methodology described in the monitoring plan that an accredited verifier has assessed as satisfactory and, where applicable, that was approved by the administering authority responsible;

(ii) the reported data do not fulfil the requirements under Regulation (EU) 2015/757, Directive 2003/87/EC, Implementing Regulation (EU) [2023/2449], Commission Implementing Regulation (EU) 2016/1928(11)or this Regulation;

[83] See below concept of ‘materiality’ for more details.

[84] The M-AVR here contains a reference to Commission Implementing Regulation (EU) 2016/1927 which has been replaced by Commission Implementing Regulation (EU) 2023/2449 after the M-AVR’s publication. For clarity, the text has been amended above accordingly.

(c) for the purpose of verifying a report at company level, that the reported data do not fulfil requirements under Regulation (EU) 2015/757, Directive 2003/87/EC and Implementing Regulation (EU) [2023/2449];

(d) for the purpose of accreditation, any act or omission by the verifier that is contrary to requirements under Regulation (EU) 2015/757, Directive 2003/87/EC and this Regulation.

In short, this means that **for the monitoring plan** and **the company-level emission report**, a non-conformity is a point in which the MP or the CER does not comply with the MRV Maritime Regulation, the EU ETS Directive and the relevant templates (i.e. cases of non-compliance). For the **ships' emissions reports** and partial reports (ERs), 'non-conformity' has a wider scope, as its definition also encompasses cases where the emissions report is not in conformity with the approved monitoring plan, on top of cases where the ER does not comply with the MRV Maritime Regulation, the EU ETS Directive and relevant templates.

Examples of non-conformities:

- Fuel quantities are determined based on different measurement instruments, or by other methods, than those listed in the MP;
- Application of emission factors different than the default ones given in Annex I to the MRV Maritime Regulation without the needed justification;
- Meters are not maintained or calibrated in line with the requirements in the ship's MP, or used in breach of the producer's specifications;
- The ER reports a fuel which was not listed in the MP;
- After a significant change, the MP has not been submitted to the verifier for assessment or to the AA for approval.

If a non-conformity results in an error, misrepresentation or omission in the reported data, it must also be regarded as a misstatement.

The M-AVR defines a '**misstatement**' to mean "*an omission, misrepresentation or error in the reported data, apart from the uncertainty permissible pursuant to [the MRV Maritime Regulation] and taking into consideration the guidelines developed by the Commission on those matters*". Misstatements can therefore be of very different nature, ranging from simple typos in transferring data from one file to another, errors in calculation formulae, omissions of data points, mixing up emission factors for different fuels, etc. Misstatements may qualify as material or non-material misstatements.

The M-AVR defines the ***materiality level*** as "*the quantitative threshold or cut-off point above which the verifier considers misstatements, individually or taken together, to be material"* and the ***material misstatement*** as "*a misstatement that, in the opinion of the verifier, individually or when taken together with other misstatements, exceeds the materiality level or could otherwise, have an impact on the total reported emissions or other relevant information.*"

As can be noted, "materiality" includes not only a quantitative (the materiality level), but also a purely qualitative element (whether it is *in the opinion of the verifier* material). Or as ISO 14065 defines it: "***materiality****: concept that individual misstatements or the aggregation of misstatements could influence the intended users' decisions*". This means in practice that a verifier may still consider misstatements below the materiality level to be material, even when considered individually. The intended users of a verification report are including the administering authority and the public, as environmental data always have to be considered of public interest, and other market participants, as emissions provide a demand for allowances and therefore impact the price of EU ETS allowances. In cases where the legislation does not provide a specific materiality level, the verifier has to define itself what level it would consider acceptable. The choice should be documented in the internal verification documentation.

4.4.2 Materiality levels

The M-AVR provides some quantitative materiality level, i.e. the quantitative threshold or cut-off point above which the verifier must consider misstatements, individually or taken together, to be material. However, in some situations, the verifier will also have to consider smaller misstatements or non-conformities to be material, if qualitative considerations make them appear material.

In the case of the emissions report or partial emissions report, the M-AVR requires a materiality level of 5% of the respective total figure reported in the reporting period for parameters such as:

- fuel consumption and GHG emissions;
- cargo carried;
- transport work;
- distance travelled and time spent at sea;
- other relevant information in the emissions report or partial emissions report.

In the case of the emissions report **at company level,** two different materiality levels are applied in line with requirements for other sectors included in the EU ETS. The materiality level is:

- **2 % of the aggregated emissions** in the reporting period for shipping companies whose total aggregated GHG emissions of all ships falling within the scope of the EU ETS Directive **exceed 500 000 tonnes of CO_2 equivalent**; and
- **5 % of the aggregated emissions** in the reporting period for shipping companies whose total aggregated GHG emissions of all ships falling within the scope of the EU ETS Directive **are below or equal to 500 000 tonnes of CO_2 equivalent**.

Note: The aggregated emissions to which the thresholds refer to are those determined in accordance with Point 1 (Points 1.1 to 1.7) of Part C to Annex II to the MRV Maritime Regulation, i.e. taking into account the relevant derogations and the phase-in of the EU ETS. Details on calculation of aggregated emissions at company level can be found in Maritime Guidance Document No.1.

For all parameters for which no materiality level is provided explicitly in the M-AVR, the verifier has to apply a level based on its professional judgement, or apply qualitative criteria, as relevant.

4.4.3 Relationship between materiality and uncertainty

The MRV Maritime Regulation defines **'uncertainty**' in the same way as the MRR[85]: It "means a parameter, associated with the result of the determination of a quantity, that characterises the dispersion of the values that could reasonably be attributed to the particular quantity, including the effects of systematic as well as of random factors, expressed as a percentage, and describes a confidence interval around the mean value comprising 95% of inferred values taking into account any asymmetry of the distribution of values." Uncertainty is a parameter relating to the quality of measurements which includes both the concepts of 'accuracy' (whether systematic errors (bias) are reduced) and 'precision' (referring to the spread of values resulting from random fluctuations).[86]

[85] For more information on uncertainty, please see MRR Guidance Document No. 4.

[86] The effect of uncertainty is that any measurement carried out with an instrument of sufficient resolution, if repeated several times, will not give only one sharp value, but different values, which show a (normal) distribution around the most likely "true" value. However, if the instrument is not properly calibrated, this most frequently displayed value may deviate from the real value. The actual uncertainty is therefore higher than just the normal distribution of the displayed values.

Uncertainty is an important parameter at the stage of developing a monitoring plan, where it is in the interest of the shipping company to minimise uncertainty as much as possible[87,88]. Verifiers assessing MPs have to consider if the uncertainty specified by the shipping company is acceptable for the purpose of the MRV Maritime Regulation. Where a shipping company applies the default admissible uncertainty value[89], the verifier should check that the measuring methods and procedures as described in the MP are consistent with the application of that default value. If the shipping company opts for determining an actual uncertainty value, the verifier will have to review the uncertainty assessment submitted together with the MP. In both cases, observations on the uncertainty levels stated in the MP may be relevant for the verifier's conclusions on the MP.

When it come to the verification of an emission report, the verifier will check whether the shipping company has adhered to the (assessed/approved[90]) monitoring plan. This involves checking whether the measuring equipment has been maintained and calibrated appropriately[91]. Failing to do so may lead to an increase in the measurement uncertainty and can be considered a non-conformity[92] (see below). Except for such checks, measurement uncertainty plays no further role in verification of data, as the uncertainty is given by circumstances which cannot be changed ex-post. As said in the definition of "misstatement", *permissible uncertainty*[93] does not contribute to the fact that data is misstated. Consequently, during verification of ship level emissions reports (ER), **measurement of uncertainty does not play a role in assessing if a misstatement is material or not**. The uncertainty as laid down in the assessed/approved MP is deemed acceptable and *not* leading to material issues. The quantitative materiality threshold (i.e. 5% for the ER) and the uncertainty level are independent parameters used for different purposes: Uncertainty informs about the quality of measurements, while materiality is a tool for verifiers to plan and perform their activities, and to judge findings.

The only situation where uncertainty needs further consideration during verification is if the verifier detects a deviation from the approved[94] monitoring plan which increases the uncertainty. This has to be considered a non-conformity. In line with the general treatment of non-conformities (see section 4.2.16), this can result in a misstatement. This happens for example if:

- Measurement equipment is not meeting the required uncertainty level as given in the approved MP[95];
- Measurement instruments are not installed properly or are not functioning correctly, have not been (properly) maintained or calibrated. In such cases, the actual uncertainty of the instrument in use must be assumed to be higher than under ideal conditions which usually form the basis for uncertainty levels given in the MP.

---

[87] In particular when bunkering, there is a commercial interest of both the supplier and the shipping company as recipient of the fuel to attain the highest possible quality of measurement. Therefore, measuring instruments for commercial transactions are often subject to specific legal requirements (National Legal Metrological Control) in order to limit uncertainty. Another key reason to limit uncertainty as much as possible for the shipping company is to improve its fuel management system onboard the ship, thus minimising operational inefficiencies.

[88] Uncertainty is defined as referring to the total annual value covered by the uncertainty, e.g. total consumption of a fuel which may result from several bunkering processes, or taking into account the overall uncertainty of fuel consumption monitoring.

[89] Maritime Guidance Document No.1 currently proposes an applicable default value of 7,5% for uncertainty.

[90] Approval by the Administering Authority of the monitoring plan will only be required for ships within ETS scope.

[91] What is "appropriate" is defined either by rules for national legal metrological control, or by the instrument's use specifications.

[92] This applies to both cases where the company has declared in the MP the recommended default value for uncertainty and to cases where the company has provided a ship-specific actual value for uncertainty.

[93] "Permissible uncertainty" means the uncertainty as assessed by the verifier / approved by the administering authority where applicable.

[94] If the monitoring plan does not require approval by the AA, this should be read as the Monitoring plan as assessed by the verifier.

[95] At this time, the MRV Maritime Regulation does not specify maximum acceptable uncertainty values the MRR, which sets those for specific tiers. However, should the MRV Maritime Regulation be updated to include tiers or other forms of uncertainty requirements, the verifier would have to check monitoring plan for compliance with those requirements, and during verification of the emissions report, whether the uncertainty level is actually met.

In both cases, the verifier has to decide if the non-conformity leads to a material misstatement. In the absence of a comprehensive uncertainty assessment by the shipping company, the verifier will apply a qualitative assessment for the misstatement. However, if uncertainty information is available, the verifier can determine the error resulting as the difference between the approved and the actual uncertainty, and determine if that error would meet the quantitative criterion[96] for being a material misstatement.

Example:

For an annual fuel consumption of 3 000 tonnes Marine Diesel Oil (MDO), the actual uncertainty is 8% instead 6% as stated in the approved Monitoring plan. The difference between 6% and 8% of the annual MDO consumption is 2% or 60 tonnes MDO. This is less than the applicable 5% threshold for materiality.

Follow-up to this finding: If the shipping company has better data to replace the one that establishes the non-conformity/misstatement, the general rule applies that every misstatement detected by the verifier must be corrected. However, if there is no corroborating data source, and as the misstatement has been found to be non-material, the verifier may still issue a positive verification statement, but include the fact on the found non-conformity and misstatement in the verification report. The shipping company should improve the situation without undue delay, i.e. ensure that the respective measuring instrument is replaced by one that is in conformity with the approved monitoring plan.

4.4.4 Approach to assessing the materiality of misstatements and non-conformities

Assessing the material effect of misstatements and non-conformities has a quantitative and qualitative aspect, and both must be considered, as has been explained in sections 4.4.1 and 4.4.2. The quantitative aspect depends on the size and nature of the impact, whereas the qualitative aspect is very much determined by factors that can influence the user, in particular the administering authority.

Whenever the verifier determines a different value than the one found in the shipping company's report (e.g. after detecting a typo or a missing value in a sum of many values), it will compare it with the reported value as follows:

Item	Reported value	Verifier's value	Difference	Material?
Item 1	A	B	A – B = C	C / Z %
Item 2	F	G	F – G = H	H / Z %
Item n	…	…	…	…
Total items	Z = A + F + …	X = B + G + …	Z – X = Y	Y / Z %

Where the difference between the reported value and the verifier's value is negative, this indicates that the original reported value was understated; where the difference is positive, this indicates that the original reported value was overstated. Then the total difference of reported values and verifier's values for all items is determined by summation of the individual items. Here it is important that the verifier does not "add apples and pears", i.e. it needs to ensure that all elements have the same unit, usually emissions. If for example an error is found in a fuel consumption (item 1) and another error in an emission factor (item 2), then both items should be first converted into emissions before adding them up. If item 3

[96] Set at 5% of the total over the reporting period in accordance with Article 17 of the M-AVR. This means the annual total in case of the ER, or the period covered by the partial emission report.

refers e.g. to distance travelled, this cannot be added to the emissions of the previous summation. However, if many errors, omissions or misrepresentations occur throughout the report and they cannot be added up, they can still be judged regarding the qualitative criterion for materiality.

In case there are several cases of positive and of negative deviations, this may give the impression that the overall sum does not deviate much, i.e. the errors even out each other. That would then result in an unjustified impression of an overall not materially misstated report, despite the fact that it contains a significant number of errors. In such cases, the verifier should also make a calculation of the sum of absolute deviations (i.e. make all deviations positive), divided by the total sum of reported errors. This percentage will be higher and will give a better understanding of the size of mistakes and the materiality of the total number of misstatements found.

The quantitative aspect and thus the materiality level alone is not the only factor when assessing whether or not a misstatement or non-conformity has a material effect. The key question for assessing the qualitative aspect is whether a misstatement or non-conformity (individually or combined) can influence the decision of the user, in particular the AA. This will depend on the number, size and nature of misstatements and non-conformities as well as on their particular circumstances of occurrence. It is important to note that misstatements and non-conformities can also have material effect on the reported data even if the materiality level is not exceeded.

Factors that can be relevant in determining whether or not a misstatement or non-conformity has material effect can be the following:

- Can the misstatements or non-conformities be corrected?
- Does the shipping company refuse to correct the misstatement or non-conformity identified[97]?
- What is the likelihood of the misstatement or non-conformity reoccurring?
- What is the duration of a misstatement or non-conformity?
- Are misstatements or non-conformities the result of an act with or without intent?
- Does the issue concern a non-conformity with the legal requirements with the MRV Maritime Regulation?

4.4.5 Examples of material misstatements

Example 1
During the verification process of ship X of company Y, it is detected that company Y made a typo in the application of the emission factor for fuel. The ship consumed only heavy fuel oil for which the emission factor is 3,114 t CO_2 / tonne fuel, while the company accidentally used a factor of 2,114 t CO_2 / tonne fuel. The ship consumed 1 000 tonnes of heavy fuel oil, leading to reported emissions of 2 114 tonnes instead of 3 114 tonnes. Representing a misstatement of 1 000 tonnes of CO_2, the impact of the misstatement therefore is 1 000 / 3 114 x 100% = 32%. This implies that if the company does not rectify the error, the total emissions in the report will be 32% lower than they should be. As the impact on the total reported number is above 5%, this is considered a material misstatement. The company must correct any error found by the verifier, even, if below 5% margin. But in case of the error being material, the impact is more severe: If the company refuses to make a correction, the verifier must issue a negative verification statement.[98]

[97] As mentioned earlier in this document, shipping companies have a general obligation to correct any non-conformities and misstatements, irrespective of the impact of the single non-conformity/misstatement.

[98] If the company refuses the correction on the grounds of a misstatement being non-material, it does not comply with the M-AVR. The only exception would be where the company is *unable* to provide the data without intent, e.g. because files have been lost during a fire at the office. In such case it is acceptable if surrogate data or estimations like in the case of data gaps are used for correction. Such correction may still have a residual misstatement character, but most likely it would not be material.

Example 2
A shipping company implemented a new IT system to collect and manage data. Through sampling the verifier noted that information on fuel consumption, distance and cargo for about 1 month of the year contains errors. If this is identified from a single sample voyage for the relevant month, the impact extends beyond just that one voyage. While the error in data for the voyage may not be material, the aggregated omission will be material. For example, the ship has done X voyages in the reporting period and the verifier has sampled 20% voyages. If 2 errors have been found in the population of 20% voyages, then the size of the error equals 10 errors in the reporting period. Thus, verifiers will evaluate the impact on the aggregated information of a single issue noted during the verification and will take into consideration the likelihood of errors in the data they have not sampled. The verifier may also consider increasing the sample size in order to get more precise assurance of the resulting error.

Example 3
During the verification process of ship X of company Y, it is detected that the company Y has not included all the bills of lading for the relevant voyages of ship X when reporting the total cargo carried. While calculating the total cargo carried, some data was inadvertently omitted. If the missing data affects the total reported number by more than 5%, this would be classified as a material misstatement. If the company does not correct the misstatement, the verifier should not provide a positive verification report for ship X.

5 REQUIREMENTS FOR VERIFIERS

While the previous chapter dealt with the activities of a verifier during verification of shipping companies' data, here in Chapter 5 guidance is given on the requirements that a verification body must fulfil for getting accreditation. These requirements are given by Chapter III of the M-AVR (Article 37 to 45) regarding the MRV Maritime and EU ETS specific requirements on verifiers. Further requirements will result from EN ISO 14065 for GHG verifiers in general. Key guidance note KGN II.8 explains how EN ISO 14065 relates to the AVR for the EU ETS for installations and aircraft operators. It applies in a similar way to the M-AVR and the verification of shipping companies.

Note the terminology: "Verifiers" are always legal persons (companies), while the individuals forming the verification team are referred to as "verification personnel", "auditors", "lead auditors", "technical experts", etc.

5.1 Continued competence process

The verifier must establish, document, implement and maintain a competence process to ensure that all verification personnel are competent for the tasks that are allocated to them. "Personnel" means not only the "shipping MRV auditor" or "shipping MRV lead auditor" but also the technical experts, independent reviewers, supporting staff that help prepare the verification: basically, anyone who is involved in verification activities.

The competence process consists of several elements as shown in Figure 4. The verifier must also have a system for recording the activities performed in the competence process as well as the results of the assessments in the competence process for all personnel undertaking verification activities.

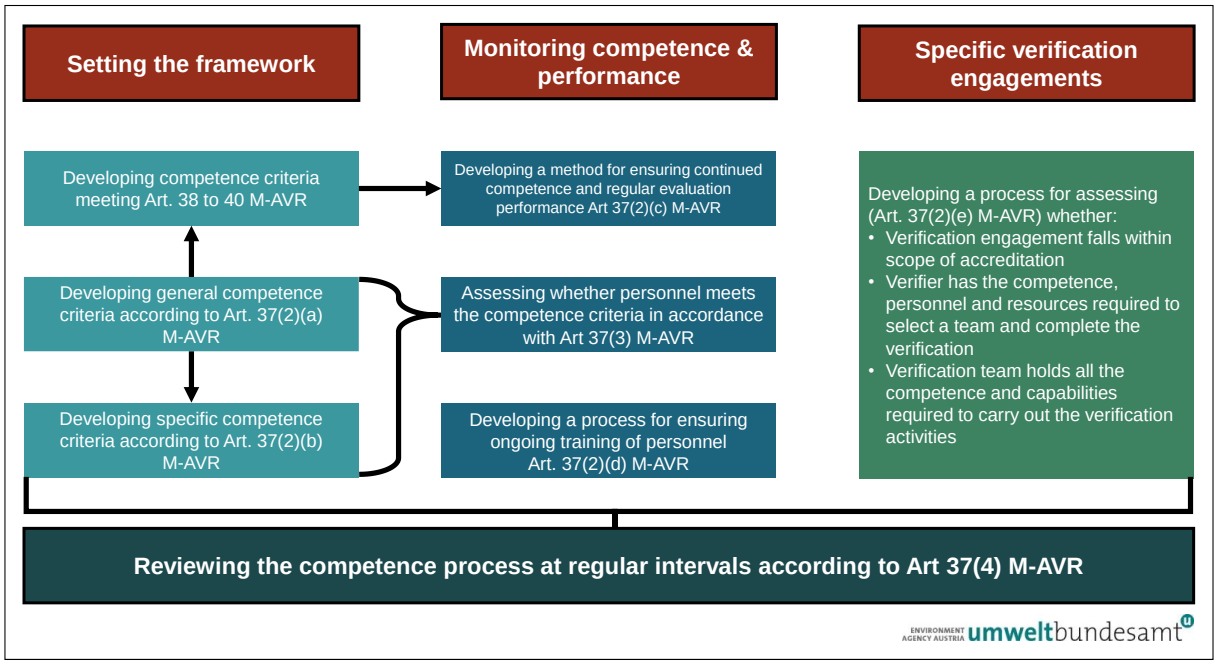

Figure 4: Elements of the competence process that verifiers have to implement

5.1.1 Setting the framework

The first element of the competence framework to be established by the verifier is to develop the aim that the verifier wants to reach, i.e. competence criteria to be met by its personnel:

- General competence criteria for all personnel undertaking verification activities (e.g. sales quotation staff, planners, shipping MRV auditors, lead auditors, independent reviewers, technical experts etc.);
- Based on these general competence criteria, specific competence criteria for each role within the verification body involved in verification activities. In particular this applies to shipping MRV auditors, shipping MRV lead auditors, independent reviewers and technical experts. When developing these specific competence criteria, the verifier takes into account specific technical and organisational issues including countries and the scope of accreditation in which the verifier operates.

These competence criteria must meet the requirements of Article 38 M-AVR (Competence of the whole team performing a verification). A verification team consists usually at least of a shipping MRV lead auditor who may be accompanied by further shipping MRV auditors. Their competence requirements are found in Article 39 M-AVR. Furthermore, each verification needs an independent reviewer who is not member of the verification team, and whose competence criteria are defined in Article 40 M-AVR. For cases where further technical experts are required as members of the verification team, their competence requirements are given in Article 41 of the M-AVR. More information on these roles and their requirements is laid out in Annex III (section 8.3) and Annex IV (section 8.4).

5.1.2 Evaluating and monitoring the competence and performance

The verifier has to establish and document procedures for ensuring continued competence which includes regular evaluating of the performance of staff involved in the verification as well as a process for ensuring ongoing training. As part of this competence process, the verifier regularly assesses the competence of each personnel undertaking verification activities against the general and specific competence criteria established as discussed in section 5.1.1. The verifier uses a combination of methods to assess that competence (e.g. tests, mentoring, observation and evaluation).

The verifier will determine what the appropriate means are for monitoring. For the shipping MRV auditors and shipping MRV lead auditors, this must be done by a sufficiently competent evaluator who monitors the competence and performance of these auditors during the verification and assesses whether the competence criteria developed in the competence process have been met. This includes accompanying them to the site of the shipping company. A competent evaluator can be a person working at the verifier. This person must be sufficiently competent to be able to make this evaluation.

If a member of the personnel fails to demonstrate that the competence criteria for a specific task allocated to him or her have not been fully met, the verifier shall identify and organise additional training or supervised work experience. The individual must be monitored until he or she demonstrates to the satisfaction of the verifier that he or she meets the competence criteria.

5.1.3 Assessment of competence for a specific verification engagement

For specific verification engagements (including assessment of monitoring plans), the verifier must check the competence of personnel and resources available during the pre-contract stage (see e.g. section 4.2.1). The verifier selects the team that meets all the competence requirements to carry out verification activities for a specific shipping company. An appropriate process for this purpose has to be developed, documented, implemented and maintained by the verifier to enable and complement this competence assessment.

5.2 Impartiality and independence

A pre-condition for accreditation is that the verifier is able to act impartially and independent from its clients. Therefore, verifiers must confirm during the pre-contract stage that they are independent from the client and that no situations compromising their impartiality exist, such as conflicts of interest. For the purpose of accreditation, the verifier must establish and document appropriate processes to ensure impartiality and independence. Risks to impartiality are sources of potential risks that may compromise or may reasonably be expected to compromise a verifier's ability to make unbiased decisions. Examples are given in Table 5.

Table 5: Potential risks to a verifier's impartiality and independence

Type of potential risk	Clarification
Source of revenue	Risks related to the shipping company paying for the verification of shipping company's report
Self-interest	Risks from a person or body acting in his/her/its own interest, for example financial self-interest
Self-review	Risks that a person or body reviews their own work. Providing verification activities for a client to whom the verifier provided consultancy would be such a self-review risk. Also the lack of an independent review, or carrying it out in a very superficial way would be a lack of control measures.
Familiarity (or trust)	Risks from a person or body being too familiar with the shipping company; Trusting the judgment or opinion of another person instead of seeking verification evidence is a familiarity risk.
Intimidation	Risks that a person or body is being coerced openly or secretly or the perception that such a situation arises, implies a risk to be addressed or reported to a supervisor

The M-AVR contains in Article 45 specific provisions on the impartiality and independence of a verifier and its personnel undertaking verification activities (see Table 6).

Table 6: Requirements for verifiers and any part of the same legal entity, regarding their impartiality and independence

M-AVR requirement	Explanation and examples
The verifier and any part of the same legal entity shall not be a shipping company or owner of a shipping company.	This means that the parent company of a verifier or a department of the same company to which the verifier belongs must not be a shipping company or own a shipping company. This is also the case if the department of the same legal entity to which the verifier belongs has no actual relations with the verifier. Any part of the same legal entity as the verifier must in all cases not be a shipping company or owner of a shipping company.
The verifier and any part of the same legal entity shall not be owned by a shipping company.	The departments and entities described above must also not be owned by a shipping company. If the shipping company has for example an interest of 30% in a verifier, legally the verifier would not be owned by the shipping company. However, this is a relationship with the shipping company that harbours an unacceptable risk to the impartiality of the verifier and is not allowed.
The verifier shall not have relations with the shipping company that could affect its independence and impartiality.	What constitutes at least a conflict of interest in the relations between the verifier and the shipping company is regulated in Article 45(5) of the M-AVR. A conflict of interest arises at least if:

M-AVR requirement	Explanation and examples
	• The relationship between the verifier and the shipping company is based on common ownership, common governance, common management or personnel, shared resources, common finances and common contracts or marketing; or • The shipping company received consultancy or technical assistance on monitoring and reporting from an organisation that has relations with the verifier and that threatens the impartiality of the verifier. In particular the verifier must not have supported the development of the monitoring plan or the emission report (whether at ship level or company level)
The verifier must be independent from bodies that are trading emission allowances	This means that a verifier must not be an entity that engages in trading emission allowance or is an owner of such an entity or is owned by such an entity. The verifier must also not have relations with the body that is trading emission allowances because that would risk the impartiality of the verifier, e.g. it must not provide consultancy advice related to the trading of emission allowances and issues that affect the shipping company.

The abovementioned elements are not exhaustive. This means that other risks can also lead to an unacceptable risk to impartiality. This could happen e.g. if a member of the verification team has shares in the shipping company that is being verified by that team, or a team member has worked in the shipping company before, or the lead auditor has previously worked for a consultancy company that implemented the monitoring system in the ship that is subject to verification.

The verifier must not use personnel or contracted persons such as technical experts in the verification of a shipping company's report that involves an actual or potential conflict of interest. EN ISO 14065 requires the verifier to instruct personnel and contracted persons that they must reveal any situation to the verifier that may pose a risk to the verifier's impartiality. The verifier uses that information to assess the risks to impartiality and what appropriate action it should take (e.g. excluding team members from a specific verification engagement).

In addition, the verifier must ensure that the activities of personnel or organisations (e.g. external organisations to which the verifier has outsourced verification activities, organisations that have relations with the verifier such as common ownership or common resources) do not affect the confidentiality, objectivity, independence and impartiality of the verifier. The verifier shall therefore implement certain safeguards that mitigate the risks to impartiality. Such measures include:

- Rotation of staff in verification engagements;
- Internal auditing and internal requirements that consultancy or other activities performed by the verifier does not infringe the requirements in the M-AVR;
- Emphasising in the training of personnel, guidance and instructions the importance of impartiality, specific training programmes for newly hired staff;
- Making sure that new staff with a history of consultancy on monitoring and reporting aspects, are not involved in verification engagement until an appropriate time, at least two years, has passed;
- Assessing the impartiality of all competent personnel (including contracted persons) that will be selected for a verification team, determining their prior relationship and contacts with the shipping company and making sure that e.g. its personnel or contracted personnel are excluded if they have provided any consultancy advice to the shipping company within a clearly defined time period (at least two years);
- Clear separation of responsibilities between those parts of the business that offer advisory services and those that offer assurance services;

- Clear processes and policies to ensure no personnel is used that poses an unacceptable risk to impartiality.

Verifiers have to monitor the impartiality risks and assess whether these safeguard measures effectively mitigate and address the risks. Most of the abovementioned safeguard measures are applied in combination. During surveillance, the National Accreditation Body will assess the impartiality of the verifier's personnel and the safeguard measures taken.

Best practices to safeguard the impartiality and independence of the verifier include setting up an independent committee, an impartiality monitoring function by an independent person or by assigning this impartiality safeguarding function to non-executive directors. This committee monitors and reviews the impartiality of the verifiers and staff on a regular basis.

More information on impartiality and independence for EU ETS verifiers can be found in the Commission's guidance document "Good practice guidance on application of EN ISO 14065: impartiality".

5.3 Rotation of lead auditors

Familiarity risks but also other risks such as self-review risks and intimidation risks can arise if verifiers carry out verification of the same shipping company for several years. As part of the normal impartiality procedures and measures outlined in section 5.2, verifiers shall take measures to reduce impartiality risks when verifying the same shipping companies as in the previous year.

One additional measure is the mandatory rotation of the shipping MRV lead auditor. Article 45(10) of the M-AVR requires a rotation of the shipping MRV lead auditor if that lead auditor has undertaken verification of emission reports at company level for the same shipping company for a period of six consecutive years. After those six consecutive years of verification, the shipping MRV lead auditor will have to take a three consecutive year break from providing verification services to that same shipping company.

The six-year period will start for example in 2025 on the verification of the 2024 emissions report at company level. In this case, rotation will have to take place after the verification of the 2029 emissions report at shipping company level, 2030 being the 6th consecutive year of verification. The verification (in 2031) of the 2030 emissions report at shipping company level will have to be carried out by another lead auditor. The lead auditor that was carrying out verification of the 2024 to 2029 emissions reports at shipping company level could resume verification directly after the 3-year break, i.e. from verification (in 2034) of the 2033 emissions report at shipping company level.

Verifiers can decide to rotate lead auditors more frequently or change the lead auditor because of other reasons (e.g. the lead auditor is leaving the verification company or is on sick leave). Impartiality concerns within the verifier may also require the verifier to rotate lead auditors. If the lead auditor has not verified the same shipping company's report for six consecutive years and rotation was carried out before those six years, Article 45(10) of the M-AVR is not applicable. However, that does not mean that no break period applies. If the verifier rotates more frequently or impartiality concerns require a rotation before those six years, the break period during which the lead auditor cannot carry out verification for the same shipping company will be defined by the verifier itself, tailored to the applicable impartiality risks. As described in section 5.2 this will be done as part of the normal impartiality procedures of the verifier which are required by EN ISO 14065. The NAB will assess these internal rotation procedures and monitor the impartiality of the verifier and its staff.

In organisations with multiple lead auditors that are competent to verify in the maritime sector, rotation of lead auditors will be easier to arrange for. Ideally verifiers select lead auditors who have not been

involved in the verification or independent review of the same shipping company. However, this may not always be possible. A few issues need to be considered by the verifier:

- If two lead auditors within the organisation have been carrying out verification for the same shipping company for six consecutive years (e.g. different lead auditors are involved in the verification of emission reports at shipping company level) both lead auditors have to be rotated according to Article 45(10) of the M-AVR;
- Where verifiers are small and have two lead auditors in their organisation, the lead auditors can rotate among themselves. In those cases, the lead auditor can for example be rotated with an independent reviewer even if that reviewer has been doing the independent review of that same shipping company for six consecutive years. The verifier does, however, need to ensure no impartiality risks arise and measures are taken to reduce familiarity risks.
- A lead auditor cannot be rotated with a shipping MRV auditor unless that shipping MRV auditor has become a lead auditor and meets the relevant competence requirements.

In some cases, rotation of other staff such as auditors may also be required because of impartiality risks. In those cases, internal procedures set-up by the verifier determine how and when rotation is carried out. This is very much dependent on concrete circumstances and tailored to the applicable impartiality risks (see section 5.2).

Please note that rotation is not the only mechanism to mitigate familiarity risks. Verifiers must implement several safeguards to ensure continued impartiality of the verifier and its personnel.

When lead auditors rotate, the new lead auditor may be less familiar with the shipping company or ship(s) and will need more time to understand the shipping company's processes and risks. High quality internal verification documentation will facilitate this process and ensure that the risk that a new lead auditor may overlook misstatements or non-conformities is mitigated. The internal verification documentation must contain sufficient detail and provide a clear track record of issues found, justifications as well as complete strategic, risk analysis and other activities carried out and decisions taken. Such documentation should include also information on how the accounting process in the shipping company works and provide information on the quality of the data flow information. Annex II of this document (section 8.2) provides more information on the content of internal verification documentation.

5.4 Outsourcing

If a verifier finds (during the pre-contract stage, or during verification) that it does not cover all competence requirements for a specific engagement (MP assessment or verification of ER or CER), or if its own staff lacks the capacity for the engagement, a verifier may contract a third party (company[99]) to carry out certain activities for the verifier. This is called outsourcing. The relevant standard (ISO 14065 in connection with ISO 17029) requires that the full responsibility for the verification process remains at the verifier, in particular that compliance with the relevant impartiality and independence criteria are ensured, that the documentation and competence requirements, as well as all requirements applicable under MRV Maritime Regulation, M-AVR and EU ETS Directive are met.

Furthermore, the M-AVR specifies in Article 45(6) that the verifier must not outsource the independent review or the issuance of the verification reports. This means that these steps are so critical for the overall verification that the verifier cannot entrust them to somebody outside its own organisation.

[99] Contracting an individual is not considered outsourcing, but adding a person to the verifier's own team, provided the contract ensures that the hired person is fully under the verifier's management system.

5.5 Other issues

In order to obtain and maintain accreditation, the verifier has to cover further topics by its procedures and documentation. Table 7 summarizes where to find guidance on these topics.

Table 7: Where to find guidance on other requirements for verifiers according to the M-AVR

M-AVR requirement	Guidance provided
Article 38: Competence of verification team	Annex III (section 8.3)
Article 39: Competence of shipping MRV lead auditor and shipping MRV auditor	Annex IV (section 8.4)
Article 40: Competence of independent reviewer	Annex IV (section 8.4)
Article 41: Competence of technical experts	Annex IV (section 8.4)
Article 42: Required procedures of verifiers	Annex V (section 8.5
Article 43: Internal verification documentation	Annex II (section 8.2)
Article 44: Records and communication	Section 3.5 of KGN II.8 (Key guidance note on the relation between EN ISO 14065 and AVR)
Article 45(6) and (7): Contracting and outsourcing	Section 3.4 of KGN II.8 (Key guidance note on the relation between EN ISO 14065 and AVR)

6 ACCREDITATION AND ACCREDITATION BODIES

Many elements of the M-AVR and the AVR for other sectors[100] of the EU ETS are very similar. In particular the process of accreditation, the requirements on accreditation bodies, the provisions on peer evaluation between NABs and the mutual recognition of verifiers between Member States follow the requirements of Regulation (EC) No. 765/2008 (the EU framework for accreditation) and applicable international standards for accreditation[101]. Therefore, this guidance document summarizes only briefly the main elements of the accreditation process.

For further information on EU ETS requirements on accreditation and national accreditation bodies, please see chapters 6 to 9 of EGD I (Explanatory Guidance Document I) which gives guidance on those elements of the AVR.

Chapter IV of the M-AVR contains requirements on the accreditation of verifiers by the NAB and their monitoring once they have been accredited. Verifiers have to be accredited by the time they issue a verification report. Other parts of their work (e.g. risk analysis, process analysis, etc.) may be carried out already while the accreditation process is still ongoing. This is even a requirement, as the NAB needs to participate in a "witness audit", i.e. observing the actual work carried out by the verifier in order to prove competence in this area.

6.1 Objectives of accreditation

In accordance with Article 48 of the M-AVR the objectives of accreditation are that the NAB assesses whether the verifier and its personnel undertaking the verification activities:

- have the competence to carry out assessments of MPs and verification;
- are performing the verification in line with the M-AVR;
- meet the requirements in Chapter III of the M-AVR which covers competence, impartiality, procedures, documentation and further requirements stated in EN ISO 14065.

The NAB is not only required to assess these elements during the initial accreditation process but also during surveillance, reassessment and extraordinary assessments.

6.2 Accreditation process

The basic accreditation process consists of several steps that are interconnected and interdependent. Figure 5 shows the sequence and relations between the most important ones of these steps. The typical accreditation process works as follows:

- The Verifier-to-be sets up its internal processes and written procedures in order to fulfil the requirements of the M-AVR, the MRV Maritime Regulation, its delegated and implementing acts[102], and the EU ETS Directive. Further requirements may also follow from the accreditation framework (Regulation (EC) No. 765/2008) and applicable international standards, in particular ISO 17029, ISO 14065, ISO

[100] The AVR covers the EU ETS for stationary installations, aircraft operators and the "ETS2" for road transport, buildings and further sectors.

[101] In particular ISO/IEC 17029:2019 "Conformity assessment – General principles and requirements for validation and verification bodies"

[102] Please see list in Annex VIII of this document (Section 8.8).

14064-3 and ISO 14066. Annex V of this document (section 8.5) gives an indicative list of required procedures.

- By applying the competence process which the verifier has to establish (section 5.1), the verifier ensures that it has sufficient staff trained for the purpose of carrying out assessment of monitoring plans and verification of ships' emission reports and company-level emission reports. The M-AVR does not differentiate between different scopes of accreditation. Therefore, maritime MRV verifiers must be competent in all the tasks provided for in the MRV Maritime Regulation, EU ETS Directive with regard to shipping company, and the M-AVR.

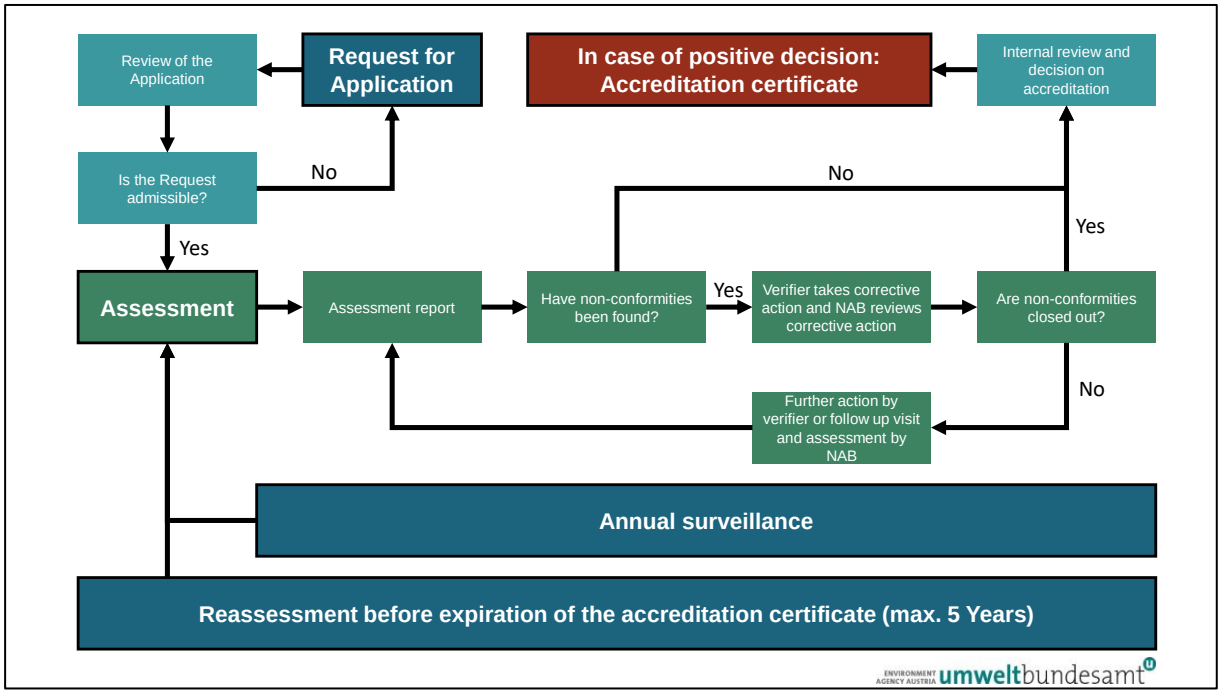

Figure 5: Basic accreditation process

- The verifier will then file a formal application for accreditation in accordance with Article 49 of the M-AVR at the National Accreditation Body (NAB)[103]. For selecting a NAB, the following guidance can be given:
  - If the verifier is established in an EU Member State, the NAB of that Member State must be selected. If that NAB does not offer accreditations for MRV Maritime scope, the NAB will inform the verifier which other NAB in the EU should be approached.
  - If the verifier is not established in an EU Member State, it is free to select any NAB in the EU, because accreditations are mutually accepted by all other Member States.
- The NAB will review the application regarding its completeness, and if relevant, request the verifier to submit further information.
- The NAB will carry out a detailed assessment (Article 50 M-AVR) of the verifier's competence, independence and impartiality. This process usually includes a document review, an on-site "office audit" (i.e. assessment activities at the premises of the verifier, e.g. for checking its quality management

[103] In accordance with Regulation (EC) No 765/2008, there is only one NAB per Member State.

system and verification procedures) and at least one “witness audit”, i.e. observing the actual verification activities of the verifier including during a site visit at a shipping company.

- The NAB will issue an assessment report. If relevant, it lists all findings and non-conformities determined during the assessment. The verifier is than given a reasonable timespan for corrective action, after which the verifier will report on the corrections made, and the NAB will decide whether further assessment is needed. If so, the verifier will be informed accordingly.
- After all non-conformities have been resolved, the NAB can issue the accreditation certificate, which may be valid for a maximum of five years (Article 51 M-AVR).

After the accreditation process has been finished and an accreditation certificate issued, the competence and actual performance of the verifier is monitored through annual surveillance. Before the accreditation certificate expires, a reassessment of the verifier will be carried out.

To ensure that verifiers are accredited by the time the verification report is issued, verifiers should submit their request for accreditation sufficiently early to enable the NAB to complete the whole process in time. This means that the verifier can enter into a verification contract with a shipping company before the accreditation certificate has been issued, provided that an application for accreditation has been submitted and the accreditation will be completed successfully by the time that the verification report is issued. An accreditation process for new verifiers normally takes 6 to 12 months, depending very much on the degree of the verifier´s preparation to be assessed and on:

- The quality of the verifier’s procedures and management system;
- The extent to which the verifier already has proper documentation and procedures in place;
- The workload of the NAB and its experience: a newly established NAB or NAB new to Maritime MRV or the EU ETS accreditation services may need additional time for the accreditation of a verifier.

6.3 Monitoring of the verifier after accreditation

The NAB must monitor its accredited verifiers to ensure that the verifier continues to be competent and meet the requirements of the M-AVR. Monitoring verifiers involves annual surveillance and reassessment, and where relevant, extraordinary assessment.

6.3.1 Surveillance

The NAB is required to carry out annual surveillance of accredited verifiers. During surveillance, the following activities will be carried out:

- A visit to the premises of the verifier to check a representative sample of the internal verification documentation, the implementation of the quality management system and the procedures and processes the verifier is required to establish and implement;
- A witness audit to assess the competence and actual performance of a representative number of staff involved in the verification or assessment of monitoring plans.

Other surveillance activities carried out during these visits can be enquiries from the NAB into aspects of the verifier relating to accreditation, requests to the verifier to provide documents and records (e.g. verification reports, complaints records, management review records). This includes updates and changes in the management system mentioned in Article 42(3) of the M-AVR, the competence process and other procedures and processes.

The same procedures as outlined in section 6.2 (Figure 5) are applicable. Usually, an assessment during the surveillance phase will be less extensive than the assessment during the initial accreditation, since the procedures, processes and management system have already been checked by the NAB.

Surveillance is normally carried out by the NAB that has accredited the verifier. However, where the verifier is carrying out the verification for a shipping company assigned to the administering authority of a Member State other than the Member State of the NAB that has accredited the verifier, the NAB that has accredited the verifier may ask the NAB of that other MS to perform the surveillance on its behalf and under its responsibility. Surveillance will be carried out by that latter NAB according to the requirements in the M-AVR, and the assessment report containing the findings and non-conformities found will be provided to the NAB that has accredited the verifier. Only that NAB can make the decision as to whether to confirm the continuation of the accreditation.

Section 7.3 explains what information is exchanged between both NABs in such cases.

6.3.2 Reassessment

A reassessment of the verifier must be carried out before expiry of the accreditation certificate. For the reassessment, the NAB follows the same steps as in the initial accreditation process to check whether the accreditation can be renewed. This evaluation is therefore more comprehensive than surveillance. The same documents and information have to be submitted by the verifier as for the first accreditation. The NAB will take into account that the verifier has gained additional knowledge and experience in the previous years that records on the competence and performance of a verifier are established. Thus the NAB takes into account the history of prior assessments of the competence of performance of the verifier.

6.3.3 Extraordinary assessment

The NAB may conduct an extraordinary assessment of the verifier at any time to ensure that the verifier continuous to meet the requirements in the M-AVR. The focus of such assessments will primarily be on resolving a specific issue for which the extraordinary assessment has been initiated. Reasons for carrying out an extraordinary assessment may include:

- Investigation of complaints about the verifier;
- Investigation of appeals related to the verifier;
- Significant changes in the verifier's organisation or management system;
- Follow-up on corrective actions;
- Follow-up on activities used to lift a suspension;
- Information obtained from public media, e.g. newspapers, television;
- Other reasons, like information received from Administering Authorities.

An extraordinary assessment does not necessarily involve a full witness audit and assessment at the premises of the verifier. It depends on the reasons for which the extraordinary assessment was initiated, the action needed and what non-conformity issue or other issue it concerns.

6.4 Administrative measures

Article 55 of the M-AVR specifies two types of administrative measures that can be imposed by the NAB if the verifier fails to meet the requirements of the M-AVR:

- **Suspension of the accreditation**: The accreditation is temporarily invalidated. This means that the verifier maintains its accreditation but is not allowed to carry out verification during the time it is suspended. Once the suspension is terminated, full verification activities can be resumed. Reasons for suspension are (Article 55(4) of the M-AVR):
  - serious breach of the requirements of the M-AVR;
  - persistently and repeatedly failing to meet the requirements of the M-AVR;
  - breach of any other specific terms and conditions laid down by the national accreditation body.
- **Withdrawal of the accreditation certificate**: The accreditation is cancelled in full which means the verifier loses its accreditation and cannot carry out any verification activities. Following Article 55(5) of the M-AVR this measure is imposed by the NAB if:
  - the verifier has failed to remedy the grounds for a decision to suspend the accreditation certificate;
  - a member of the top management of the verifier or a verifier's staff involved in verification activities under this Regulation has been found guilty of fraud;
  - the verifier has intentionally provided false information or has intentionally concealed information.

In other cases than mentioned above, the NAB may impose one of the measures above where the verifier does not meet the requirements of the M-AVR. This is likely to depend on the type, size and nature of the infringement, reoccurrence of a particular infringement and whether more than one infringement has been found. Furthermore, the verifier may request that the NAB suspends or withdraws its accreditation.

The administrative measures take effect when the decision to impose the measures is notified to the verifier. This also applies when that decision is appealed. The national accreditation body shall consider the impact on activities carried out prior to those decisions in the light of the nature of the non-compliance. The effects of administrative measures can only be terminated if the appeal has reversed the decision to impose administrative measures.

To ensure a proper and fair application of the administrative measures, the NAB is required to establish, document, implement and maintain procedures for the application of administrative measures. Procedures for the resolution of appeals will be regulated by the Members States. This is usually done in national law when establishing the organisation and structure of the NAB.

7 INFORMATION EXCHANGE

The quality of work of the verifiers is of key importance to the proper functioning of the EU ETS and the MRV Maritime Regulation. However, supervision functions in the EU ETS are split: The administering authority (AA) supervises the compliance of shipping companies by approving the monitoring plans of ships, and by reviewing if needed verified emission reports at company level, during which activity they also look into the verification reports. The verifier is under the supervision of the national accreditation body (NAB). For carrying out this function effectively, it is useful for the NAB to gain information from the AA about any findings from their review. On the other hand, also the AA will benefit from knowing about the NAB's activities. Therefore, an information exchange in a harmonised and well-structured manner between the various parties involved in EU ETS compliance processes is crucial to strengthening the quality of verification, and enhancing transparency in the compliance chain. Information exchange on verifier related issues is not only important between the NAB and the AA within the Member State (MS), but also across borders when verifiers are operating in other MS. It also concerns duties of the verifier to provide information to its NAB. Chapter VI of the M-AVR addresses both situations.

7.1 Cooperation and information exchange

Member States are required to establish an effective information exchange and cooperation between their NAB and the AA. Examples of effective cooperation may be meetings and written correspondence between the NAB and the AA[104], providing regular exchange of information on experience with verifiers and deficiencies encountered during reviews of verified emission reports or the witnessing of verifiers by NAB. In some MS, the AA also meets with their verifiers to explain new requirements in the legislation and discuss problems concerning the interpretation of monitoring or reporting requirements.

In addition to this regular cooperation and information exchange, the M-AVR lays down structured requirements to share information at appropriate points in time to support not only the NAB but also the AA in carrying out their compliance ensuring tasks and overseeing the quality of verification. It concerns the following requirements (numbers refer to the processes indicated in Figure 6 for the simplified case of only one MS).

1. **Notification from the verifier to the NAB**: Before, or at the latest on 15 November of each year, every verifier has to notify information to the NAB that has accredited it. The information to be notified relates to the planned activities (verifications, site visits) of the verifier, which the NAB needs for setting up its work programme and for preparing its management report. The information sent by the verifier is indicative and may be subject to change, since e.g. dates of site visits may change and need to be updated in that case. Where changes occur in the information, the verifier must notify these to the NAB within a timeframe agreed with that NAB.
2. **NAB's work programme:** The NAB uses the notified information of the verifiers to draft a work programme which describes the planned activities in relation to the accreditation activities (e.g. planned assessments, planned witness audits). By 31 December of each year, the NAB that has accredited the verifier must submit the work programme to the AAs in charge of the shipping companies where the verifier is intending to carry out verification. This means that the work programme must potentially go to the AA of different MS. The information that each of these AAs receives will only contain information on the verifiers that are carrying out verification for shipping companies administered in their MS. If there are changes in the information of the work programme, the NAB has to submit an updated work programme by 31 January of the following year.

[104] Where relevant, i.e. where the MS has more than one competent authority active in the EU ETS, including the AA with regard to shipping companies, then one of those authorities has to be designated as the focal point authority for information exchange in accordance with Article 64(2) of the M-AVR. For simplicity, the text above refers just to "the AA".

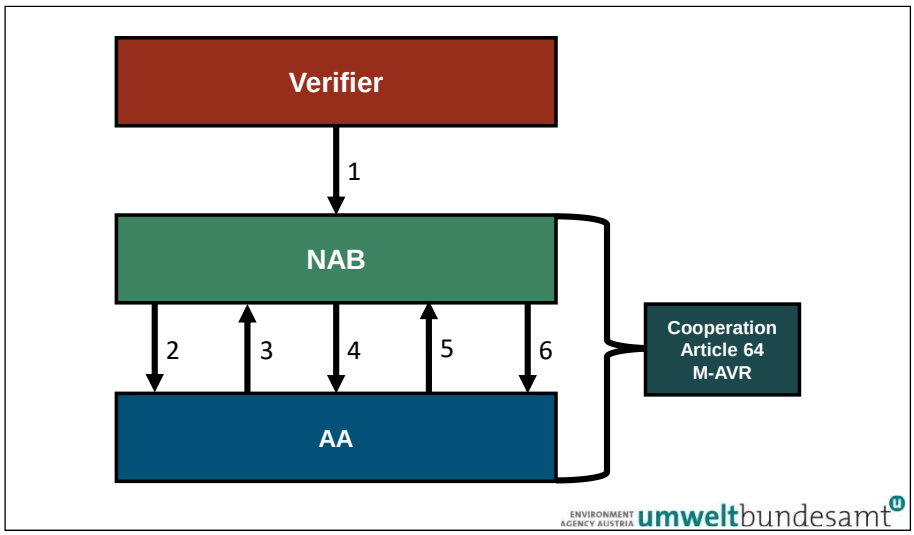

Figure 6: Information exchange for verifier accredited by NAB of the MS where it is established

3. **General information from AA to NAB**: When the AA mentioned under point 2 has received the work programme, it must provide the NAB with any information that is relevant for the assessment of the respective verifiers. This information feedback from the AA to the NAB can for example relate to national legislation, national guidance, FAQ or other MS-specific requirement.
4. **NAB's Management report**: By 1 June of each year the NAB has to provide feedback in a management report on what activities have been carried out in the preceding 12 months. This implies that the activities to be carried out in the period after submission of the management report (June-December) will be covered in the management report of the next year. The management report is sent to the AA(s) of the MS which administers shipping companies on which the verifier is carrying out verification and the MS where the verifier is accredited.
5. **Specific Information from AA to NAB**: The AA of the shipping company where the verifier is carrying out the verification must provide certain information to the NAB that has accredited the verifier. In particular, information relevant for the NAB's surveillance tasks should be communicated without undue delay to the NAB, for example:
   - Evidence that the verifier is not complying with the M-AVR;
   - Issues spotted by the AA during the review of the monitoring plans or (company-level) emission reports, or during evaluation of internal verification documentation that clearly shows that the verifier has insufficient knowledge of or expertise in the shipping company's activities within the scope of accreditation;
   - Negligence in identifying material misstatements;
   - Findings that the verifier has been involved in consultancy for the shipping company, in particular in setting up the shipping company's monitoring system or drafting the monitoring plan for the shipping company and nevertheless is carrying out the verification for that same shipping company.

   This information enables the NAB to take action on a particular verifier if the AA has identified issues related to that verifier during its activities. Reported issues by the AA are to be treated by the NAB like complaints against the verifier. This means that the NAB must decide on the validity of the complaint, ensure that the verifier concerned is given the opportunity to submit its observations, take appropriate action to address the complaint and record the complaint. Appropriate action could for example involve starting an extraordinary assessment, imposing administrative measures or taking

other measures to ensure that the verifier resolves the non-conformities. The NAB must respond to the AA that has exchanged the information with the NAB within three months of the date of the NABs receipt of the information. In those cases, the NAB has to inform the AA of the action taken and, where relevant, the administrative measures applied.

To support the NAB in their surveillance activities and other accreditation activities, it is important to exchange the information on a timely basis. It is recommended that the AAs submit the information by 30 September of each year unless it concerns information that requires immediate action by the NAB, like the examples listed above.

6. Immediate **information exchange on administrative measures**: The NAB that has accredited the verifier must immediately notify the AAs and NABs of each MS if:
   - The NAB has imposed administrative measures on the verifier;
   - The suspension on accreditation has been lifted;
   - A decision on appeal has reversed the decision of the NAB to impose administrative measures.

   The NAB should share relevant information: e.g. type of administrative measures imposed and the date that the administrative measure was imposed or lifted.

7.2 Information exchange across borders

If the verifier accredited by a NAB carries out verification activities in another MS (meaning on shipping companies for which the administering authority is in a different Member State), the M-AVR requires that NAB to submit the work programme and management report to the AAs of each MS where the verifier is operating. In turn, the AA of all those MS must exchange information to all the NABs from which they have received a complaint on that verifier or identified issues concerning that verifier during the review of emission reports, inspection at the shipping company or the evaluation of internal verification documentation. Figure 7 represents a situation in which:

- the verifier is accredited by a NAB in the MS where it is established (MS 1); and
- the verifier carries out verification(s) in its own MS (MS 1) and in other MS (MS 2 - MS 3).

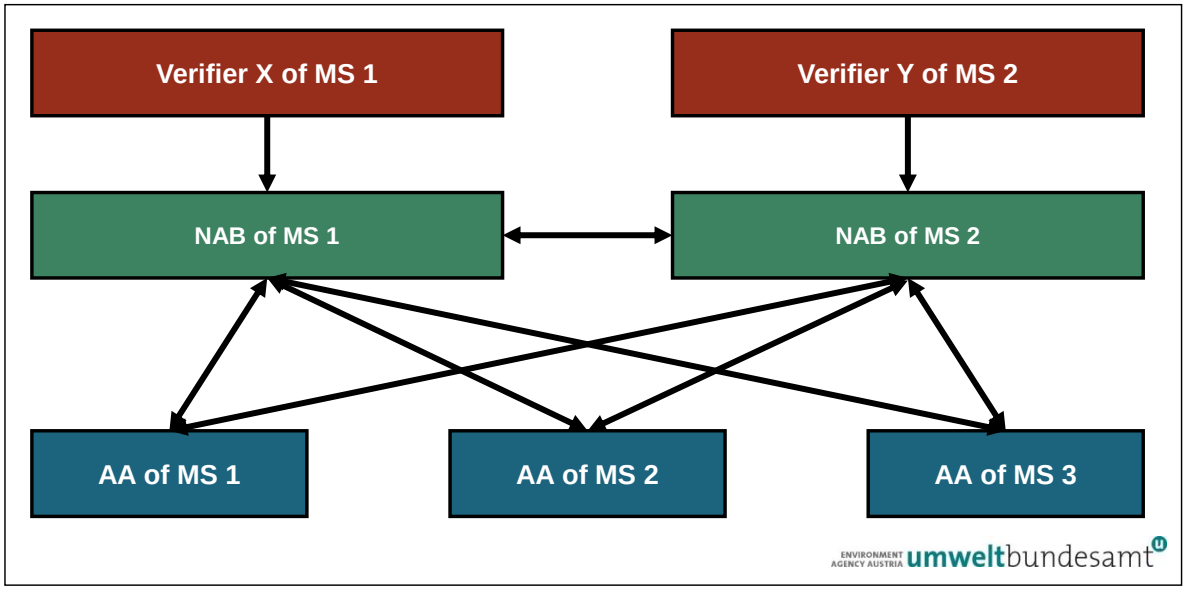

Figure 7: Information exchange for verifiers carrying out activities in another MS (example for two verifiers, two NABs and 3 MS)

7.3 Information exchange on surveillance

If the verifier is carrying out the verification on a shipping company administered by another MS, the NAB that has accredited the verifier can request the NAB of that other MS to perform surveillance activities on its behalf and under its responsibility. In such cases the NAB that has carried out the surveillance shall report its findings, i.e. the assessment report, to the NAB that has accredited the verifier unless otherwise agreed between the two NABs.

The NAB that has accredited the verifier must take these findings and the assessment report into account when assessing whether the verifier meets the requirements of the M-AVR. If the assessment report indicates that the verifier is not complying with the M-AVR, the NAB that has accredited the verifier must take action (including imposing administrative measures as appropriate). In those cases, the NAB must inform the NAB that has carried out the surveillance on the type of action taken, how the findings were resolved by the verifier (if this is appropriate) and if administrative measures were imposed, and what these measures were.

7.4 Database

Each NAB must set up and manage a database that provides access to other NABs, AAs, verifiers and shipping companies. This will enable these parties to look into the accreditation status of the verifier. The database must contain at least the following information which is made publicly available as well:

- Name, accreditation number and address of each verifier accredited by that NAB;
- The date on which accreditation was granted and the due expiry date of the accreditation;
- Information on administrative measures that have been imposed on the verifier. This should for example include information on the type of administrative measure imposed, when it was imposed, information on when suspension was lifted or when a decision on appeal has reversed the original decision to impose administrative measures.

To access the relevant NAB online database, please visit the “Directory of EA Members and MLA Signatories” page on the European Accreditation (EA) website[105] (select the scope “Validation and Verification” by clicking on “Enter any keyword or choose in the list below”).

[105] https://european-accreditation.org/ea-members/directory-of-ea-members-and-mla-signatories/

8 ANNEXES

8.1 Annex I - Timeline for Verification

Table 8 below provides an overview of the stages and actions involved in the verification against a proposed annual timeline. Dates in bold are compulsory and set by legislation. Dates in normal text are suggested to keep the process on track and ensure verifications are completed on time and within the available verifier resources. Please note that the suggested timelines are not mandatory and may not be applicable for all shipping companies. It should further be noted that in the case of partial emission reports, which are due no later than three months after the change of company, the relevant verification timeline shall be adapted accordingly.

Table 8: Timeline for verification

Date	Actions and Stages of the Verification
At any the time in advance of commencing verification work but **before issuing a verification report**	Verifier obtains accreditation to perform verification in the MRV Maritime / EU ETS scope
No later than 2 months after first port of call in a port under jurisdiction of a Member State (MS)	Shipping company submits a monitoring plan (MP) for its ship to the verifier for assessment
No later than 3 months after the ship's first port call in a port under the jurisdiction of a Member State	Shipping company submits to the AA a monitoring plan (MP) for its ship, already (positively) assessed by a verifier
By July (during the reporting period, i.e. Year N)	Shipping company contracts verifier. Verifier performs pre-contract stage (see section 4.2.1)
By September (Year N)	ER (and CER) verification – Stage 1: Strategic analysis (see section 4.2.3); check MP and compliance with relevant regulation and principles, review accounting methods and processes, discuss any issues with the shipping company and raise any issues related to non-conformities; risk analysis (section 4.2.4); plan detailed verification work and documentation
By October/November (Year N)	ER (and CER) verification – Stage 2: Perform preliminary detailed verification based on 6 to 9 months actual data and obtain a full year's forecast of total emissions, recheck MP, its implementation and compliance with MRV Maritime Regulation and principles, check data flow, control activities and MP procedures. Raise any issues related to misstatements or non-conformities
By 15 November Year N	The verifier submits to the relevant national accreditation body the information on its planned verification activities, as required under Article 71 of the M-AVR[106].
By end of January / end of February Year N+1	ER (and CER) verification – Stage 3: Year-end reconciliation. Reconcile full year forecast (if available) and full year actual emissions (checking completeness and correctness of report), investigating anomalies, final check on MP and compliance with relevant regulation and principles. Raise any issues related to misstatements or non-conformities

[106] These include: planned time and place of foreseen verifications, address and contact details of the companies subject of its verification activities, names of the members of the verification team.

Date	Actions and Stages of the Verification
By end of February/ early March Year N+1	ER (and CER) verification – Stage 4: Complete verification of the final annual emissions report, partial emissions report, or emissions report at company level and send those, together with the relevant verification report(s), to the shipping company for submission to AA
By 31 March[107] Year N+1	Shipping company to submit verification report, verified emissions reports and, if applicable, emissions report at company level to AA
By 31 March Year N+1	Verifier or shipping company to enter the verified emissions data (corresponding to what reported in the CER) into the Registry. Failure to confirm the figure by 31 March will result in the account being blocked to further trades
By 30 September Year N+1	Shipping company to surrender emission allowances (corresponding to number reported in the CER and in the Union Registry), otherwise non-compliant

8.2 Annex II - Internal verification documentation

The internal verification documentation of the verifier needs to document the full audit trail as performed by the verifier in order to prove that only evidence-based decisions have led to the verification opinion. It furthermore forms the basis for the checks by the NAB whether the verifier stands up to its competence requirements and actually implements the required procedures. Therefore, it should at least cover the following elements:

- Results of the evaluation of risks to undertake the verification[108] during the pre-contract stage and the evaluation itself;
- The time allocation as well as any revisions in the time allocation and reasons for such a revision;
- The contract with the shipping company and any other relevant information used to prepare the verification;
- Information on the verification team that has performed the verification and how this team was compiled:
- Names of the shipping MRV auditor, shipping MRV lead auditor and other relevant team members;
- Roles and responsibility of each verification team member;
- Time spent on verification activities by each team member;
- Conclusions on the independence and impartiality checks and clearance of the independence of reviewers to start the verification;
- Identification of the criteria against which the emissions report was verified to understand the basis for the verifier's verification conclusion;
- Conclusions on follow-up of issues or recommendations from previous verifications;
- What information by the shipping company the verification team has used to cross-check data and carry out other verification activities;
- The shipping company's emissions reports, partial emissions reports and emissions report at company level – a clear identifier is needed, e.g. the exact timestamp by which the report was transmitted in THETIS-MRV;
- The conclusions of the strategic analysis, risk analysis and process analysis and these analyses in full;

[107] The administering authority may require the submission of the verified report by an earlier deadline, but not earlier than 28 February of the same year.

[108] In this Annex, "verification" should be read as including also engagements of monitoring plan assessments.

- The verification plan including a sampling plan where relevant, any revisions and updates of that plan and reasons for amending the plan, additional activities to be carried out and other conclusions related to the verification plan and process analysis;
- The verification activities undertaken and results of checks made on the control activities, procedures and data. The activities described in the internal verification documentation should in principle be in line with the verification plan unless changes have occurred during the verification process;
- Relevant evidence gathered during the verification;
- Information on what activities are performed on-site, or virtually, and which ones off-site;
- If a site visit has been waived, the reasons for waiving the site visit, how the data has been checked and verification has been carried out without the site visit, and evidence that all conditions for waiving the site visit have been met; and in case of objection by the AA, the respective evidence thereof, including the reasons for such objection;
- If a virtual site visit was carried out, the justification for carrying out virtual site visits as well as the assessment of risks, any evidence that all conditions for carrying out virtual site visits have been met, how the virtual site visit was carried out; what technologies were used and whether there were complications during the virtual site visit; activities carried out during the virtual site visits and dates on which these activities took place; experts and team members involved in virtual site visit; information on whether a physical site visit was carried out after the virtual site visit and the reasons for carrying out this physical site visit. Changes on site visit planning that have occurred during the verification process;
- Information and evidence on samples taken and what sampling method was used;
- Reasons for increasing or decreasing the sampling size and resolution of all issues identified which required further investigation and their eventual outcome, as well as evidence on the rationale for the conclusions reached on the report;
- Conclusions on data quality and materiality regarding the confirming of the shipping company's data in the emissions report. This includes the materiality threshold that has been applied and a justification for judgments made concerning the quantitative and qualitative assessment of whether misstatements and non-conformities have material impact on the reported data;
- All non-conformities that have been corrected during verification – where relevant this may involve the assessment of an update of the monitoring plan;
- During the verification of emissions reports, partial emissions reports or emissions reports at company level, non-conformities or misstatements that have been identified by the verifier, and a description of how these have been resolved must be included in the internal verification documentation. If these misstatements or non-conformities are closed during the verification, this should be marked as such;
- Justifications for the verification statement made by the verifier;
- Where appropriate, a description of any significant, inherent limitation associated with the verification of the emissions report against the criteria. It should be clear whether there is a limitation of scope in the verification, whether there were circumstances or whether a restriction was imposed that prevented the verifier from obtaining evidence required to reduce the verification risk to a reasonable level;
- The conclusions on the verification of the emissions report, partial emissions report or emissions report at company level;
- Results of the independent review and the name of the independent reviewer.

8.3 Annex III – Verification teams

The verification team consists at least of a shipping MRV lead auditor and, where the verifier's conclusions during the pre-contract stage and the strategic analysis require it, a suitable number of shipping MRV auditors and technical experts. Team members not only have to meet the competence requirements that are specific to them but also the following general requirements (Table 9).

Table 9: General requirements for verification teams in accordance with Article 38 M-AVR

Requirement	Explanation
Each team member shall have a clear understanding of his or her individual role in the verification process	Each team member must understand that he or she: ● remains impartial to the activity verified, free from bias, and avoids any actual or perceived conflict of interest; ● maintains his or her objectivity throughout the verification; ● demonstrates fair behaviour through trust, honesty, working with diligence and responsibility, observing the law, maintaining confidentiality etc.; ● reflects truthfully and accurately the verification activities and findings; ● exercises due professional care and judgment; ● is able to draw meaningful and accurate conclusions, give opinions and make interpretations based on observation, knowledge, experience, literature and other sources of information.
Each team member shall be able to communicate in the language necessary to perform his or her specific tasks	The team should be able to share and distribute relevant information through written communications (e.g. reports, notes, letters etc.). Verbal communications should be conducted in an appropriate language and in a professional manner. The information should also be presented, in a format that is well understood by all parties. Therefore, the team should, for example, be able to: ● explain what documentation a shipping company has to provide to the team to allow for the necessary input to the verification process; ● explain the verification process to the shipping company; ● interview relevant personnel at the shipping company in a manner so that they understand the required output and the team can gather the necessary evidence for verification purposes; ● explain identified misstatements and non-conformities to the shipping company and the requirement to correct those; ● explain what the findings from the verification process mean and what their consequences are; ● write a verification report based on an analysis of findings from the verification activities and use terms and language appropriate for verification statements. Not all team members necessarily have to speak the language required for the verification in the country in which the team carries out the verification. However, the team must have at least one person who is able to communicate and write in that language. An interpreter can be hired to provide that competence. In those cases, the team must be able to communicate effectively while using the interpreter. The risk for hiring an interpreter is a verification risk that the verifier accepts based on the risk analysis. The verifier remains responsible for the quality of the translation and that the translation is according to standards and properly certified.

At least one person in the team must have the technical competence and understanding required	The understanding required includes for example: ● How to perform strategic analysis, risk analysis, develop verification plans and perform the process analysis including data sampling and verification; ● Technical aspects of the respective ships, technologies used on board, emissions data processing, control systems, etc., as provided in the ships' monitoring plans; ● Legal requirements of the MRV Maritime Regulation, its implementing and delegated acts, and the EU ETS Directive's requirements. More examples on technical competence are given in Table 10.

Where the verification team consists only of one person, that person must cover all the competences listed in Table 9 and must be a shipping MRV lead auditor. Note that the independent reviewer must be a person who is not part of the verification team.

As the verifier has to check the application of the monitoring methodology and to carry out plausibility checks of the data involved, the team as a whole needs to understand the specifics of the shipping company. Otherwise, the verifier will not be able to assess the material correctness of the data and the correct implementation of the monitoring plan. Table 10 provides an indication of which technical competence and understanding should apply for the team as a whole to assess the specific technical monitoring and reporting aspects in the context of MRV Maritime and EU ETS for shipping companies.

Table 10: Examples of technical expertise and competence required for MRV Maritime and EU ETS

Elements of technical expertise and competence	Examples of knowledge and skills related to technical competence
Assessing aspects of the monitoring plan	Being able to assess and understand: ● How the monitoring plan is implemented on the ship; ● How to check the emission report against the monitoring plan; ● How to analyse information and data to confirm whether the monitoring plan is still appropriate and is being implemented.
Specific GHG activity and technology	Being able to: ● Identify and understand which key operations impact the ships' and shipping company's GHG emissions; ● Understand the actual operational processes being used onboard the ship; And having: ● General knowledge of the technologies applicable to the shipping sector and the technologies leading to GHG emissions; ● Generic knowledge of GHG emissions and global warming potentials.
Relevant GHG sources	Being able to understand and have the knowledge of: ● The ships' and shipping company's activities, equipment and relevant processes, emission sources and source streams (fuels); ● The categorisation of ships, by type and/or operational profile; ● Assessing the completeness of source streams and emission sources.
Quantification, monitoring and reporting including relevant technical and sector issues	Being able to understand and have knowledge of techniques relevant for monitoring and reporting which requires skills such as the ability to: ● Assess the selection, use and maintenance of measurement and calibration devices;

Elements of technical expertise and competence	Examples of knowledge and skills related to technical competence
	• Determine the extent of testing needed to check the completeness, accuracy and reliability of information used in the analysis; • Identify corroborating information that supports the material correctness of the reported data; • Conclude whether to accept or reject the information or whether to modify the testing; • Identify the purpose of computations and what methodology is required. Having knowledge and understanding of MRV Maritime and EU ETS specific monitoring issues such as: • The correct application of monitoring methods A to C, selection of correct emission factors and coverage of all relevant GHGs; • For Method D, if applicable: the system and elements used for continuous emissions measurement, the standards applied, the measurement points and measuring frequencies, the calibration procedures, the parameters used for determining the GHG emissions, the sampling rates, the requirements for determining missing data, data management and storage, and the method used to check the results of continuous measurement; • Knowledge of the relevant standards, where applicable: e.g. calibration standards, measurement standards, management system standards and their use; • Assessing uncertainty and the validity of information used to calculate uncertainty levels of fuel quantities and emission factors (for measurement systems under and outside the shipping company's control); • Assessing data gaps, the conservativeness of the approach to complete the data gap and measures to avoid double counting of GHG emissions; • If relevant, knowledge of ways to determine alternative emission factors, including the techniques for chemical analysis, sampling and sample preparation, including the application of a sampling plan and chain of custody. For the purpose of reporting aggregated data at shipping company level for the EU ETS, having knowledge of differences in MRV rules for the EU ETS and MRV Maritime Regulation, such as: • Differences in coverage of GHGs and ship types, and the phase-in time table of the EU ETS; • Assessing compliance with requirements for zero-rating of biomass and alternative fuels; • Treatment of voyages between EEA ports and between an EEA port and a port in a third country; • Exemptions for islands, public service obligations, and outermost regions; • If relevant, technical knowledge of carbon capture techniques and relevant MRV rules as given by the MRR[109]; • If relevant, applicable rebate for ice-class ships; • Aggregation of data from emission reports and partial emission reports to give company-level emission reports.
Knowledge related to the shipping company's organisation and quality assurance	• Shipping company's specific data flow and risk assessment; • Shipping company's specific control activities in relation to data flow; • Overall organization with respect to monitoring and reporting, as well as the control environment in which the shipping company's accounting system operates;

[109] Monitoring and Reporting Regulation of the EU ETS; Commission Implementing Regulation (EU) 2018/2066.

Elements of technical expertise and competence	Examples of knowledge and skills related to technical competence
	• Procedures mentioned in the MRV Maritime Regulation; e.g. procedures for data flow activities and control activities; and for managing the responsibilities for monitoring and reporting within a shipping company.
Knowledge related to verification agreements	• Understanding contracts or other agreements with the shipping company to manage conflicts that could impact the verification (e.g. time allocation in contracts with the shipping company).

Roles of the verification team members

All the verification is carried out under the responsibility and direction of the shipping MRV lead auditor. He or she must therefore have the respective skills and competences (see section 8.4). The shipping MRV auditor, if assigned to the team may carry out verification activities under the supervision and responsibility of the Shipping MRV lead auditor.

If the shipping MRV auditor or lead auditor or independent reviewer needs support on a specific subject matter, a technical expert may be called in to provide detailed knowledge and expertise on that subject matter. This could concern all types of issues such as technical sector specific knowledge, IT expertise, language needs, technical expertise on specific standards or calibration equipment etc. The technical expert undertakes the activities for which his or her support is needed, under the direction and full responsibility of the shipping MRV lead auditor of the verification team in which the technical expert is operating or the independent reviewer if the technical expert is providing support to the independent reviewer. The primary function of the technical expert is to provide information to the verification team.

8.4 Annex IV – Competence of different team members

Shipping MRV auditors have to meet specific competence requirements. Table 11 lists these and includes an explanation of those requirements as well as examples related to those requirements. **Shipping MRV lead auditors** must have the same competences as Shipping MRV auditors, and in addition:

- Demonstrated competence to lead a verification team and to be responsible for carrying out the verification activities in accordance with the M-AVR.

This means that lead auditors are in general more senior and experienced staff with more authority than normal auditors, which must also be evident from the verification body's organisational structure. The lead auditor must be empowered to sign verification statements on behalf of the verifier.

Table 11: Competence requirements for shipping MRV auditors

Article 39(2) of the M-AVR	Explanation and examples of competence
Knowledge of the specific legislation, relevant standards and relevant guidance including Member State's specific guidance	This involves knowledge of (non-exhaustive list): • EU ETS Directive (in particular Articles 3ga to 3gg on the inclusion of maritime transport into the EU emissions trading system and Annex I on activities covered by EU ETS Directive; • The MRV Maritime Regulation and its implementing and delegated acts (see list in section 8.8 of this guidance document); • The M-AVR and guidance material developed by the Commission to support the interpretation of the M-AVR;

Article 39(2) of the M-AVR	Explanation and examples of competence
	• To the extent needed, the AVR and MRR and the guidance material developed by the Commission to support their interpretation in a harmonised manner; • Relevant standards: this includes for example: EN ISO 14064-3, EN ISO 14065 and EN ISO 14066; • Relevant national legislation and guidance issued by the MS in which the verifier is carrying out a verification, or where it is accredited.

Knowledge and experience of data and information auditing	Knowledge and experience of data and information auditing methodologies which includes, for example, the ability to:
	• Assess the risks involved in carrying out verification including assessment of conflict of interests;
	• Carry out a strategic analysis;
	• Determine the time needed for a verification and to assess when additional time is necessary to complete the verification;
	• Carry out verification activities with reasonable level of assurance;
	• Check the initial effectiveness of control activities as an input to strategic and risk analysis;
	• Determine the extent of substantive data testing in the process analysis;
	• Notice whether the verification plan needs updating because of findings and to communicate that to the lead auditor. The lead auditor decides on the revision of the verification plan and revises it;
	• Determine corrective action and its impact on the data and information assessment;
	• Make decisions on the data and information reported based on findings from the data and information assessment;
	• Collate appropriate evidence and information to support decisions;
	• Identify situations and factors that may affect the materiality of misstatements (including typical and atypical operating conditions);
	• Analyse the material impact of misstatements and non-conformities on the reported data;
	• Identify risks that could result in material misstatements and decide on the need to gather additional evidence or to extend the depth and detail of verification activities;
	• Use information obtained from a variety of sources and form conclusions based on that analysis;
	• Use the materiality level in the verification process;
	• Evaluate the sufficiency and significance of the evidence and analysis;
	• Identify inconsistencies, unexpected circumstances and findings by carrying out for example analytical procedures;
	• Evaluate the overall adequacy of documentation.
	• Knowledge and experience of analysing inherent and control risks.[110]
	• Knowledge and experience of sampling techniques which includes, for example, the ability to:
	  ◦ Manage complex data collection and recording interfaces;
	  ◦ Deal with data manipulation processes and their challenges;

[110] Note that the risk analysis itself has to be carried out by the lead auditor, who will make all the decisions resulting from the risk assessment.

Article 39(2) of the M-AVR	Explanation and examples of competence
	• Identify actual data system problems and failures, and take appropriate action (i.e. increasing the sampling size in the data sampling plan and reporting potential non-conformities and misstatements); • Use audit processes to identify information, statements and facts that contradict the data in the emission report; • Challenge assumptions and statements in the emission report. • Knowledge and experience in assessing data and information systems, data flows, control activities and procedures which includes, for example, the ability to: • Understand statistics, financial and economic accounting tools and practices; • Assess computer information system environments; • Assess the GHG information system to determine whether the shipping company has identified, collected, analysed and reported on the data in a way that is necessary to compile an accurate emissions report; and has taken corrective action to address misstatements and non-conformities; • Use appropriate methods for obtaining or developing the information needed: e.g. document review, observation, cross checking with external sources, interviews, inspection of whether the control activities are functioning; • Integrate information from various sources comparing information from internal and external sources; • Evaluate data, errors in data, data sources, applicable processes and data management systems; • Evaluate the functioning of control activities and correct implementation of procedures for control activities (e.g. how the shipping company manages IT systems and new technologies); • Remain alert to the possibility of false information; • Understand the implications of misstatements and non-conformities and recommended improvements in robustness and controls.
The ability to perform the verification activities listed in Chapter II of the M-AVR	This includes, for example, the ability to: • Carry out data verification and analytical procedures, e.g. comparing projected emissions with actual results, making logical inferences; • Retrieve relevant information and apply knowledge in a manner appropriate for the verification activities; • Understand the meaning, translation and interpretation of information; • Think critically and analyse multiple inputs; • Distinguish between facts and inferences, and to exercise professional scepticism; • Carry out independent research and challenge assumptions and evidence asserted by the shipping company; • Strike a balance between attention to detail and a high level assessment of the anticipated outcome during the verification process; • Manage detail, particularly at the level of ensuring that required checks are performed, e.g. checking between the emission report and the approved monitoring plan; • Evaluate the information, data and assumptions and make professional judgments; • Apply verification methods in expected and unanticipated situation; • Communicate the verification process and the results with the shipping company; • Be aware that the verification plan needs to support the nature, timing and extent of the verification. The actual responsibility for ensuring this is the case lies with the lead auditor and he/she should have full knowledge and experience on that;

Article 39(2) of the M-AVR	Explanation and examples of competence
	• Ensure that the internal verification documentation contains sufficient information to support the verification report and meets the requirements of the M-AVR; • Draft verification reports according to the requirements.
Knowledge of and experience in sector specific technical monitoring and reporting aspects that are relevant, referred to in Annex I of the M-AVR	The shipping MRV auditor must have the necessary knowledge and experience of sector specific technical monitoring and reporting issues related to the maritime sector. Annex I of the M-AVR lists the following (*italics show the Regulation text,* normal font indicates additional guidance): *(a) understanding of the relevant regulations under the MARPOL Convention and the SOLAS Convention such as those on energy efficiency for ships, the NO_x Technical Code, the Sulphur Oxides Regulation, the Fuel Oil Quality Regulation, the Intact Stability Code 2008 and relevant guidelines (such as guidance on the development of the Ship Energy Efficiency Management Plan (SEEMP));* *(b) possible synergies between monitoring and reporting in accordance with Regulation (EU) 2015/757* [the MRV Maritime Regulation] *and existing maritime-specific management systems (including the ISM Code) and other relevant sector-specific guidance (such as guidance on the development of the SEEMP);* *(c) emissions sources on board the ship;* *(d) registration of voyages and procedures ensuring the completeness and accuracy of the list of voyages and of the list of ships (as submitted by the company);* *(e) reliable external sources (including ship-tracking data) that could serve to cross-check information with data from ships;* *(f) fuel consumption calculation methods, as applied by ships in practice;* *(g) the application of uncertainty levels in accordance with Regulation (EU) 2015/757* [MRV Maritime Regulation] *and relevant guidance* [e.g. maritime guidance document No.1]*;* *(h) the application of emission factors for all fuels and emission sources used on board the ship, and for all greenhouse gas emissions covered by Regulation (EU) 2015/757* [MRV Maritime Regulation]*;* *(i) knowledge of the implementing acts adopted pursuant to Article 14(1) of Directive 2003/87/EC* [i.e. the Monitoring and Reporting Regulation, MRR]*, in particular with regard to how to account for emissions from biofuels, emissions from a mix of zero-rated sources and sources that are not zero-rated and emissions from renewable fuels of non-biological origin and recycled carbon fuels;* *(j) understanding of the certification of fuels pursuant to Directive (EU) 2018/2001 of the European Parliament and of the Council* [The Renewable Energies Directive, RED II]*;* *(k) fuel handling, fuel cleaning, tank systems;* *(l) ship maintenance/quality control of metering equipment;* *(m) bunkering documents, including bunker delivery notes;* *(n) operational logs, voyage abstracts and port abstracts, ship deck logs;* *(o) commercial documentation, such as charter party agreements, bills of lading;* *(p) existing statutory requirements;* *(q) operation of the ship's bunkering systems;* *(r) determination of fuel density by ships in practice;* *(s) data-flow processes and activities for the calculation of cargo carried (in volume or mass), as applied to ship types and activities under Regulation (EU) 2015/757* [MRV Maritime Regulation]*;*

Article 39(2) of the M-AVR	Explanation and examples of competence
	(t) concept of deadweight carried as applicable to ship types and activities under Regulation (EU) 2015/757 [MRV Maritime Regulation] *in accordance with Implementing Regulation (EU) 2016/1928* [[111]]*;* *(u) data-flow processes used to calculate distance travelled and time at sea for voyages in accordance with Regulation (EU) 2015/757* [MRV Maritime Regulation]*;* *(v) machinery and technical systems used on board the ship to determine fuel consumption, transport work and other relevant information.*

In addition to the aforementioned requirements of the shipping MRV auditor, the **shipping MRV lead auditor** must have demonstrated competence to lead a verification team and to be responsible for carrying out the verification activities, and to undertake the roles assigned to a shipping MRV lead auditor. This means that the shipping MRV lead auditor must for example have sufficient skills to:

- Assign team members based on an analysis of the competence needed to carry out specific tasks during the verification for a particular shipping company;
- Understand the rigour of verification activities needed for obtaining reasonable assurance;
- Be able to communicate on the progress, concerns and findings to the client;
- Challenge findings from team members and manage the team;
- Manage the verification process and manage the drafting of the verification report;
- Be able to function as a team leader to ensure that the verification is performed in accordance with the M-AVR.

Competence of technical experts

The technical expert must have:

- The competence and expertise required to effectively support the shipping MRV auditor or lead auditor or independent reviewer on the subject matter for which his knowledge and expertise is requested;
- Sufficient understanding of MRV Maritime and EU ETS specific legislation and guidance, data and information auditing and the activities needed to carry out assigned tasks. The technical expert does not have to possess full competence on all these issues but he should understand it sufficiently to be able to support the shipping MRV (lead) auditor during the verification.

Competence of independent reviewers

The independent reviewer must meet the competence requirements of a shipping MRV lead auditor. Furthermore the independent reviewer must have the necessary competence to:

- Analyse the information provided to confirm the completeness and integrity of the information;
- Challenge missing or contradictory information;
- Check data trails to be able to assess whether the internal verification documentation is complete and provides sufficient information to support the draft verification report.

An independent reviewer must have appropriate authority to objectively review the draft verification report and internal verification documentation and reject them as unsound if necessary. What constitutes

[111] Implementing Regulation on determination of cargo carried for categories of ships other than passenger, ro-ro and container ships.

sufficient and appropriate competence, experience and authority depends on the circumstances of the verification engagement.

In the communications between the independent reviewer and the shipping MRV lead auditor, care should be taken that the reviewer's objectivity is maintained. If this objectivity is compromised or the authority of the independent reviewer is threatened, another independent reviewer must be appointed.

8.5 Annex V – Procedures

As a requirement for accreditation, verifiers must establish, document, maintain and implement procedures covering their activities including their management system. This requirement comes from the international standards to be applied for GHG verification (ISO 17029 in combination with ISO 14065). KGN II.8 (Key guidance note on Relation between the AVR and EN ISO 14065) gives more detailed insight. The most important procedures required for M-AVR purposes are listed in Article 42 of the M-AVR as follows (*italics show the Regulation text,* normal font indicates additional guidance)

Article 42 M-AVR requires:

1. Verifiers shall establish, document, implement and maintain one or more procedures and processes for the verification activities described in Articles 4 to 36 [i.e.: assessment of MPs (section 4.1 of this document), verification of ship-level emission reports and partial emission reports (section 4.2) and verification of company-level emission reports (section 4.3)]*.*

2. When establishing and implementing such procedures and processes, the verifier shall carry out the activities in accordance with [ISO 14065:2020][112].

3. Verifiers shall establish, document, implement and maintain a quality management system to ensure consistent development, implementation, improvement and review of the procedures and processes in accordance with the harmonised standard referred to in paragraph 2 [ISO 14065:2020].

The quality management system shall include the following:

- *(a) policies and responsibilities;*
- *(b) management review;*
- *(c) internal audits;*
- *(d) corrective action;*
- *(e) actions to address risk and opportunities and to take preventive action;*
- *(f) control of documented information.*

4. In addition, verifiers shall establish the following procedures, processes and arrangements in accordance with the harmonised standard referred to in paragraph 2 [ISO 14065:2020]*:*

- *(a) a process and policy for communication with the company;*
- *(b) adequate arrangements to safeguard the confidentiality of information obtained;*
- *(c) a process for dealing with appeals of the companies;*
- *(d) a process for dealing with complaints (including indicative timescale) of the companies;*
- *(e) a process for issuing a revised verification report where an error in the verification report, emissions report, partial emissions report or report at company level is identified after the verifier has submitted the verification report to the company;*
- *(f) a procedure or process for outsourcing verification activities to other organisations;*

[112] In the M-AVR this standard is referred to as "*the harmonised standard pursuant to Regulation (EC) No 765/2008 concerning requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition*".

(g) a procedure or process to ensure the verifier takes full responsibility for verification activities performed by contracted individuals;

(h) processes ensuring the proper functioning of the quality management system as referred to in paragraph 3, including:

i. processes for the review of management system at least once a year, not exceeding 15 months between management reviews;

ii. processes for conducting internal audits at least once a year, not exceeding 15 months between internal audits;

iii. processes for identifying and managing non-conformities in the verifier's activities and taking corrective action to address those non-conformities;

iv. processes for identifying risks and opportunities in verifier's activities and taking preventive actions to mitigate those risks;

v. processes for the control of documented information.

8.6 Annex VI – Sampling

Sampling is the application of a procedure where less than 100% of a population is checked and verified compared to all data and/or control activities/procedures that are subject to verification. This is important, as the verifier usually does not have the time/budget to check 100% of information and data, but must be sufficiently confident that the results are representative, enabling the drawing of conclusions about the entire population from the sample. For the application of the MRV Maritime Regulation this applies to the sampling of relevant data from one ship, when a ship's emission report or partial emission report is verified. It is not allowed to perform fleet verification including sampling. This means it is not possible to conclude e.g. for a fleet of 20 ships of the same type that if the reports of 10 ships have been verified satisfactorily, the other 10 ships' reports will also be satisfactory. Instead, every ship's report must be verified individually.

However, when a company-level emission report (CER) is subject of the verification, all the ships' reports have already been verified. In this case it is allowed that the verifier applies sampling within the fleet, e.g. for checking selected verification reports for reported misstatements and non-conformity, in order to get an impression of the overall company's data quality.

Sampling is one of the verification activities that is impacted by the risk analysis and therefore requires the verifier to have an understanding of the different types of risks mentioned in section 4.2.4.

Depending on the verifier's analysis of the level of inherent and control risks, the verifier determines whether sampling is justified, which samples it needs to take, what the sampling size and selection approach should be and which types of tests or other checks it should undertake on each sample.

Table 12 includes an indicative list of factors that impact the sample size.

Table 12: Factors influencing the sample size

Factor	Explanation
Inherent risks and control risks	If major weaknesses are identified during the testing of control activities, the verifier will conclude that the confidence obtained from that control activity is low and therefore that the risk of material misstatement is high. In that instance the verifier will aim for a larger test sample to give it the necessary confidence that all possible misstatements will be detected. If no major weaknesses are found in the testing of the control activities, the confidence obtained from applying tests on the system and the control activities will be high meaning that the verifier is confident that it may trust the system and therefore aim for a smaller test sample. In both cases the verifier's professional judgement is applied to the percentage of the population that is sampled to give it the necessary confidence that all possible misstatements will be detected.
The results of analytical procedures	Fluctuations and trends in data, deviations from previous years, data gaps, outliers, as well as unexpected data without explanation from the company will require special attention and affect the number of data points to be sampled.
The requirement to deliver a verification opinion with reasonable assurance	The sampling and the sampling results need to enable the verifier to provide an opinion with reasonable assurance suggesting a higher rather than lower percentage of the population being included in the sample.

Types of Sampling

The verifier has the option to choose between statistical and non-statistical sampling using its professional judgment. Professional judgment will also be used in the planning, performing, and evaluating of sampling, and the sample evidence obtained in relation to other verification evidence.

This choice between statistical and non-statistical sampling is often based on several considerations, such as the number of emissions source streams and data points per emissions source stream, the variation between those data points, and the degree to which the sample allows a conclusion on the entire population of data or control activities. The verifier uses its professional judgment to assess factors such as the characteristics of the data, the control activities or the procedures for control activities, and the risks in relation to these characteristics to determine the appropriate sample size.

Sampling risk is the risk that the verifier’s conclusion based on a sample may be different from the conclusion if the entire population were subjected to the same verification procedure.

Non-statistical Sampling

Any sampling procedure that does not permit the numerical measurement of the sampling risk is a non-statistical sampling procedure, even if the verifier rigorously selects a random sample, by using instead professional judgment to select the sample items.

For most verifications, the non-statistical approach will be appropriate. This is because many important verification tasks relate to non-numerical items, e.g. questions such as “are the proper control activities installed, implemented and maintained”. This also applies to the verifier's analysis of the nature and cause of errors as well as its conclusion on the mere absence or presence of errors. The verifier can in this situation choose a fixed sample size of items to be tested for each key control activity if the size of the sample is increased if errors are identified. Nonetheless, professional judgment remains critical in determining the relevant factors to consider. However, if a non-statistical approach is being used, the results of the sampling do not allow extrapolation to the entire population.

What impacts the verifier's detection risk and therefore the sample size?

Verification Risk (VR) = Inherent risk (IR) x Control risk (CR) x Detection Risk (DR)

The combined inherent and control risk can be determined, an example of a 3-tier risk approach is shown in Table 13. However, for better differentiation the verifier could also use an approach using 5 risk levels: limited, low, medium, high, extreme. Another option is to use a quantitative methodology (risk quoted from 0 to 10 for instance). It is up to the verifier to decide.

Table 13: Verification risk as result of inherent and control risk

Verification risk		Control Risk		
		Low	Medium	High
Inherent Risk	Low	Low	Medium	Medium
	Medium	Medium	Medium	High
	High	Medium	High	High

Statistical Sampling

With statistical sampling, sample items are selected in a way that each sampling unit has a known probability of being selected. The verifier will use probability sampling and selection methods, i.e. random, systematic or stratified sampling, to select the items to be reviewed during verification.

Probability sampling provides an objective method of determining the sample size and selecting the items to be examined. A number of sampling techniques come into perspective that assist the verifier in its conclusion on the number of misstatements in the sample and the misstatements in the entire population of data.

Sample selection

Apart from the distinction between statistical and non-statistical sampling, the verifier will also choose between the following sampling approaches:

- **Random selection**: Applied through random number generators, for example, random number table;
- **Systematic selection**: The number of sampling units in the population is divided by the sample size to give a sampling interval, for example 50, and having determined a starting point within the first 50, each 50th sampling unit thereafter is selected.
- **Value-weighted selection**: Sample size, selection and evaluation results in a conclusion in value amounts (e.g. tons of fuel consumed);
- **Haphazard selection**: The auditor selects the sample without following a structured technique. Although no structured technique is used, the auditor would nonetheless avoid any conscious bias or predictability (for example, avoiding difficult to locate items, or always choosing or avoiding the first or last entries on a page) and thus attempt to ensure that all items in the population have a chance of selection.
- **Block selection**: Selection of a block or blocks of contiguous items from within the population. Block selection cannot ordinarily be used in audit sampling because most populations are structured such that items in a sequence can be expected to have similar characteristics to each other, but different characteristics from items elsewhere in the population. Although in some circumstances it may be an appropriate audit procedure to examine a block of items, it would rarely be an appropriate sample selection technique when the auditor intends to draw valid inferences about the entire population based on the sample.

Examples of sampling procedures

Example 1: Non-statistical sampling in voyages data

The aim is to take a sample from the voyages a ship performed which are in MRV scope in the reporting period. The example shows possible results for different fictitious ships, carrying out 15, 50, 150, 400 or 800 voyages a year. The resulting sample sizes required depending on the combined inherent & control risks are shown in Table 14.

Table 14: Required sample size for Example 1

Voyages per year	Combined inherent & control risk		
	low	medium	high
15	5	11	15
50	9	20	33
150	13	29	48
400	16	36	60
800	16	36	60

Please note that sample sizes in non-statistical sampling are based on professional judgment. Verifiers can identify different levels of sample sizes based on their professional judgment.

Example 2: Statistical sampling in voyages data

The following approach may be used for data sampling:

1. If the number of voyages accounting for a significant share of aggregated reported emissions (e.g. more than 3,3 % of the total emissions reported) is less than 30, 100% sampling should be carried out.
2. If the number of voyages accounting for a significant share of aggregated reported emissions is more than one per month and is more than 30 per year, and if verification is possible for more than 50% of the time in the total number of voyages, then voyages for six months out of a year shall be selected in the descending order of reported emissions and 100% sampling of these shall be carried out.
3. If no single voyages contribute significant emissions (less than 3,3% of the total) or if even selection and verification of the 50% mentioned above is difficult due to time consideration, then Table 15 may be applied for determining the minimum sample size. The verifier will evaluate the inherent risk and control risk and control measures taken by the company. The High, Medium and Low residual risk shall be evaluated. The verifier may increase the minimum sample size based on its professional judgement, professional scepticism and the result of the risk analysis.

Table 15: Sample sizes used for Example 2

Number of voyages accounting for a significant share[113] of aggregated reported emissions emission	Sampling % of the total voyages
0 – 12	100
13 – 30	50
31 – 50	34
51 – 90	21
91 – 150	14
151 – 280	9
281 – 500	5
501 – 1200	3
1201 – 1500	2

The above table is based on the following assumptions:

- Optimum use of the time allocated by the verifier for each element of the verification process;
- Consideration is given to the relationship between the cost of obtaining evidence and the usefulness of the data and information obtained;
- The table can be revised after due diligence i.e. based on analysis of the time allocated for each vessel, cost vs. sample data usefulness for evaluating materiality of the sampled data;
- The revision of the above table can be done after the verification for the purpose of verifications during the following year(s).

4. A random selection method can be implemented when selection and verification of the 50% is difficult. Sampling work may become complicated, therefore a systematic sampling method may be used for sampling.

   When sampling 30 voyages from the total voyages, systematic sampling method (equal interval sampling) can be used. Equal interval sampling is performed as described below. Line up the annual voyages sequentially starting from the beginning of the reporting period and assign numbers to the voyages. Take the start number as 1. Divide the total number of voyages by 30 and fix the sampling interval. An example of the number of voyages = 258 is shown below:

   - (Number of voyages in 1 year) / (Number of voyages sampled) = 258/30 = 8,6
   - Omitting the fractional part, we take sampling interval d = 8.
   - Take the number for performing the first sampling as A_1.
   - The further sampling numbers are $A_n = A_1 + (n-1) \times 8$
   - Do this sequentially until n= 30 – 1) = 29.

   The general rule is to determine the starting point A_1 after generating a random number between 1 and N, but a simple method may be implemented for the first number. That is, select an arbitrary number within the numbers of the sampling interval (1 to 7) and take it as the starting point.

   During systematic sampling, care is needed to ensure that the population list does not have periodicity. Under this condition, the items obtained by systematic sampling may be treated almost similarly to the items obtained by random sampling.

[113] More than 3,3% of aggregated reported emissions.

Using the data sampled, carry out the appropriate verification check, e.g. confirm that the value shown on the sampled voyages coincides with the value reported by the company. Furthermore, to check if the sample is representative for the total population, estimate the total figure (e.g. emissions) for one year from the 30 sampled voyages. If this value is within 5% of the total (e.g. emissions) submitted by the company, end the sampling.

The calculation method for the latter estimate is as follows:

Calculate the total figure (e.g. emissions) for one year estimated from 30 extracted voyages as:

$T_{total} = \sum T_i \ / N_{sample} \times N_{total}$

Where T_i are the values of the sampled items (e.g. the 30 emissions values of the 30 sampled voyaged), N_{sample} the number of samples picked, and N_{total} the total number of items in the population (here: 258). Therefore:

$T_{total} =$ (sum of sampled values) × (258/3) = (sum of sampled values) × 8.6

Now, compare the calculated value of T_{total} with $T_{reported,annual}$, i.e. the total for one year submitted by the company.

5. If $\frac{T_{total}-T_{reported,annual}}{T_{reported,annual}} < 5\%$ then treat the sampling as complete.

   If 5% is exceeded, the sampled number is probably inadequate; therefore, add to the sampled number and perform the sampling and verification for the second time.
6. Take the sampling number for the second time as a multiple of 30. That is, take 30 x 2 times = 60. If the sampling number is taken as two times, accuracy may be assumed to improve by $\sqrt{2}$=1,414. However, even if 60 items are sampled, if the estimated value of the total is not within 5% of the annual total value, increase the sampling number further.

   Take the sampling number for the third time as 30 x 3 times = 90.
7. Repeat the procedure above similarly from here onward. Increase the sampling number until the estimated value of the total obtained from sampled data falls within 5% of the total value for the year.

Example 3: Statistical Sampling in Bunker Delivery Notes (BDNs) or another data set such as tank sounding readings used in the reporting period

Table 16 presents sample sizes for reaching 5% materiality levels. Data could be verified based on a sample taken using the following approach:

- if detection risk is low then divide value from Table 16 by 2;
- if detection risk is medium then use the sampling size given in Table 16;
- if detection risk is high then multiply the value from Table 16 by 2 to get the sampling size.

Example:

Ship X from company Y bunkers twice a week, i.e. 104 times. How many BDNs do you need to sample?

Assumption: Inherent risk is high and control risk is medium. Then the combined inherent and control risk is high.

Therefore, the verifier needs to increase the sample size, and the sample size is 20 × 2 = 40 BDNs.

Table 16: Sample sizes used for Example 3

Size of dataset	Sampling size to reach a 5% materiality level
2 to 8	3
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20
151 to 280	32
281 to 500	50
501 to 1200	80
1201 to 3200	125
3201 to 10000	200
10001 to 35000	315
35001 to 150000	500

8.7 Annex VII – comparing ships' data to external sources

Purpose

Article 15(1) of the MRV Maritime Regulation requires that "*The verifier shall identify potential risks related to the monitoring and reporting process by comparing reported greenhouse gas emissions with estimated data based on ship tracking data and characteristics such as the installed engine power. Where significant deviations are found, the verifier shall carry out further analyses*."

Therefore, verifiers shall compare reported data with an "external set of estimated data". This comparison gives the opportunity to reduce the scope of samples to be analysed / tested in detail when verifying the ship's emissions report. In essence, it allows adapting the verification activities to the result of the risk analysis.

The "external set of estimated data" would cover the following data for a specific ship:

- aggregated fuel consumption;
- aggregated GHG emissions;
- aggregated distance; and
- aggregated time spent at sea.

For the purpose of the verifier performing the comparison, ship tracking data could be obtained through different sources such as:

- onboard sources, such as the navigational or electronic chart display and information system (ECDIS);
- an information and tracking system such as Automatic Identification System (AIS) or Long Range Identification and Tracking (LRIT);
- port call information related to ship movements.

It should be acknowledged that the output figures of the external set of estimated data are not derived (as measurements) from compilations from the ship (i.e. data been produced / compiled by the shipping company).

In the following, this Annex focusses on the external data triggered by the Automatic Identification System (AIS) signal as an example for best practice. Essentially, the timely repeated signal of the ship's position is combined by modelling and calculating, with other ship specific data (from openly available data sources) and as such derives to the "external set of estimated data" on fuel consumption and GHG emissions.

In regard of date / time records and the covered distances, in principle the data for "distance travelled" and "time spent at sea" is just the addition of places where the signal moved geographically and time wise (in Greenwich Mean Time, GMT/UTC).

The AIS transmits with time intervals of 2 to 10 seconds ship's information about position, course and speed. The distance covered by the ship between two AIS messages can be computed by using the "Haversine formula", which is an expression that gives distances between two points on a sphere from their longitudes and latitudes.

Furthermore, it should be noted that due to technical problems on the AIS as such, like unfavourable weather conditions (for the signal itself) and / or user mistakes, the AIS records can be missing or incomplete. Sometimes, e.g. in pirate areas, the system is shut off intentionally.

For cases of good AIS coverage, the data for "distance travelled" and "time spent at sea" appears to be a quite reliable external set of reference data.

Attentiveness with handling of the external set of estimated data

It should be acknowledged that the AIS-based modelling of ships' fuel consumption underlays intrinsically some uncertainties caused by environmental conditions that are not (and cannot be) reflected to its full extent into the modelling. Typically, the models are re-connected (calibrated) to "real" ships fuel consumption; however, deviations caused by several factors do exist. Nevertheless, if aggregated yearly, these models may serve as quite representative assessment of a ship's fuel consumption over the year.

The following list is providing some examples of the factors influencing possible deviations of the model from the conditions the ship is exposed to in reality. The non-exhaustive list may serve as indication:

- Reflection of real weather conditions:
  - The fuel consumption can easily double or triple in strong wind / weather conditions;
  - Weather routing systems would be discredited in AIS-modelling as it doesn't take into account the higher fuel consumption in bad weather areas which the routing system is avoiding, and instead calculates just the longer distance for getting around the bad weather area (this is also true for the negative effect of travelling longer distance at higher speed in order to achieve same Estimated Time of Arrival, (ETA));
- Current in seas and estuaries;
- Draft and trim variations of the ship (fully laden or ballast);
- Fuel consumption for auxiliary engines / boilers is modelled and may be ship type / loading and route dependent, those consumers are not commonly identical;
- Sometimes AIS signals are not captured. Therefore, on high seas a coverage gap might occur; this might influence the results, distance determination;
- Maintenance condition of ships' machinery influences the SFOC (Specific Fuel Oil Consumption);

- Maintenance and condition of ships' hull influences the resistance and by that the fuel consumption (see above);
- Different AIS model may vary and might provide different aggregated outputs;
- Only generic ship machinery data are provided by public available data bases. In case ship owners have applied efficiency improvements but have not changed the data in the public available data set (e.g. HIS-data base[114]), the efficiency increase (= decrease in fuel consumption) cannot be reflected properly.

The sample size for voyages being analysed / tested comes as an outcome from the risk analysis the verifier is obliged to perform as part of the data verification process. Verifiers make use of external sets of estimated data which might allow an adaptation of verification efforts, .e.g. in decreasing the sample size the verifier needs to analyse / test in detail.

If the data on aggregated fuel consumption and on aggregated GHG emission reported from a ship is within about ± 20% of the "external set of estimated data", it is considered best practice that the sample size of voyages to be analysed / tested in detail may be decreased up to 40% of the initial sample size.

Example:

Verifier's risk analysis original voyage sample size:		20 voyages
Aggregated fuel consumption of the ship as reported for the emission report:		
Heavy Fuel Oil (HFO):	5000 t	
Marine Gas Oil (MGO):	1200 t	
Sum:	6200 t	
Result of external estimated fuel consumption:		
Sum:	6000 t	
Comparison of reported fuel consumption with external estimated fuel consumption is well within the ± 20% proximity level		
Verifier can reduce the sample size up to 40% of the original size sampling:		12 voyages

[114] Ship data base sorted by IMO No. (HIS is the company trade name)

8.8 Annex VIII – Relevant Legislation

ETS Directive: Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, amended several times. Download consolidated version: **http://data.europa.eu/eli/dir/2003/87/2024-03-01**

MRV Maritime Regulation: Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport, and amending Directive 2009/16/EC (Text with EEA relevance). Download consolidated version: **http://data.europa.eu/eli/reg/2015/757/2024-01-01**

AR (Framework Accreditation Regulation): Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and repealing Regulation (EEC) No 339/93. Download consolidated version: **http://data.europa.eu/eli/reg/2008/765/2021-07-16**

AVR (Accreditation and verification Regulation for EU ETS sectors other than maritime transport): Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council. Download consolidated version: **http://data.europa.eu/eli/reg_impl/2018/2067/2025-01-01**

MRR (Monitoring and Reporting Regulation for EU ETS sectors other than maritime transport): Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012. Download consolidated version: **http://data.europa.eu/eli/reg_impl/2018/2066/2024-07-01**

Implementing and delegated acts under the MRV Maritime Regulation and EU ETS Directive with respect to shipping companies:

M-AVR (Maritime Accreditation and verification Regulation): Commission Delegated Regulation (EU) 2023/2917 of 20 October 2023 on the verification activities, accreditation of verifiers and approval of monitoring plans by administering authorities pursuant to Regulation (EU) 2015/757 of the European Parliament and of the Council on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport, and repealing Commission Delegated Regulation (EU) 2016/2072. Download official journal version: **http://data.europa.eu/eli/reg_del/2023/2917/oj**

Administration of shipping companies: Commission Implementing Regulation (EU) **2023/2599** of 22 November 2023 laying down rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards the administration of shipping companies by administering authorities in respect of a shipping company. Download official journal version: **http://data.europa.eu/eli/reg_impl/2023/2599/oj**

Attribution of shipping companies to the administering authority: Commission Implementing Decision (EU) **2024/411** of 30 January 2024 on the list of shipping companies specifying the administering authority in respect of a shipping company in accordance with Directive 2003/87/EC of the European Parliament and of the Council. Download official journal version: **http://data.europa.eu/eli/dec_impl/2024/411/oj**

Act on Templates: Commission Implementing Regulation (EU) **2023/2449** of 6 November 2023 laying down rules for the application of Regulation (EU) 2015/757 of the European Parliament and of the Council as regards templates for monitoring plans, emissions reports, partial emissions reports, documents of compliance, and reports at company level, and repealing Commission Implementing Regulation (EU) 2016/1927. Download official journal version: **http://data.europa.eu/eli/reg_impl/2023/2449/oj**

Aggregated Company-level reporting: Commission Delegated Regulation (EU) **2023/2849** of 12 October 2023 supplementing Regulation (EU) 2015/757 of the European Parliament and of the Council as regards the rules for reporting and submission of the aggregated emissions data at company level. Download official journal version: http://data.europa.eu/eli/reg_del/2023/2849/oj

Identification of certain neighbouring container transhipment ports: Commission Implementing Regulation (EU) **2023/2297** of 26 October 2023 identifying neighbouring container transhipment ports pursuant to Directive 2003/87/EC of the European Parliament and of the Council. Download official journal version: http://data.europa.eu/eli/reg_impl/2023/2297/oj

Exceptions for Small Islands and PSOs (Public Service obligations): Commission Implementing Decision (EU) 2023/2895 of 19 December 2023 laying down the list of islands and ports referred to in Article 12(3-d) of Directive 2003/87/EC of the European Parliament and of the Council and the list of transnational public service contracts or transnational public service obligations referred to in Article 12(3-c) of that Directive. Download consolidated version: http://data.europa.eu/eli/dec_impl/2023/2895/2024-01-01

8.9 Annex IX – Acronyms

Abbreviation	Explanation
AA	Administering Authority
AIS	Automatic Identification System
AR	Accreditation Regulation (Regulation (EC) No 765/2008)
AV	Accreditation and Verification
AVR	Accreditation and Verification Regulation (Commission Implementing Regulation (EU) 2018/2067)
BDN	Bunker Delivery Note
CER	Company Emission Report
CR	Control Risk
DoC	Document of Compliance
DR	Detection Risk
EA	European cooperation for Accreditation
EC	European Commission
ECDIS	Electronic Chart Display and Information System
EEA	European Economic Area
EEC	European Economic Community
EFTA	European Free Trade Association
EGD	Explanatory Guidance Document
EN	Euronorm
ER	Emission Report
ETA	Estimated Time of Arrival
EU ETS	EU Emissions Trading System
GD	Guidance Document
GHG	Greenhouse Gas
HFO	Heavy Fuel Oil

Abbreviation	Explanation
IEC	International Electrotechnical Commission
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
IR	Inherent Risk
ISAE	International Standard on Assurance Engagements
ISM	International Safety Management
ISO	International Organization for Standardization
KGN	Key Guidance Note
LRIT	Long Range Identification and Tracking
MARPOL	International Convention for the Prevention of Pollution from Ships
M-AVR	Maritime Accreditation and Verification Regulation (Commission Delegated Regulation (EU) 2023/2917)
MDO	Marine Diesel Oil
MGO	Marine Gas Oil
MLA	Multilateral recognition Arrangement
MP	Monitoring Plan
MRR	Monitoring and Reporting Regulation (Commission Implementing Regulation (EU) 2018/2066)
MRV	Monitoring, Reporting and Verification
MRVA	Monitoring, Reporting, Verification and Accreditation
MS	Member State
NAB	National Accreditation Body
PSO	Public Service Obligation
RCF	Recycled Carbon Fuel
RFNBO	Renewable Fuel of Non-Biological Origin
ROB	Rest On Board
SEEMP	Ship Energy Efficiency Management Plan
SFOC	Specific Fuel Oil Consumption
SLCF	Synthetic Low-Carbon Fuel
SOLAS	International Convention for the Safety of Life at Sea
UTC	Coordinated Universal Time
VR	Verification Risk